INITIAL DEVELOPMENT OPERATIONS COORDINATION DOCUMENT

ATWATER VALLEY BLOCK 261
OCS-G 16890

VORTEX PROSPECT

OFFSHORE, ALABAMA

Anadarko Petroleum Corporation
1201 Lake Robbins Drive
The Woodlands, Texas 77380
Contact: Judy Davidson
judy_davidson@anadarko.com
(832) 636-8766

ANADARKO PETROLEUM CORPORATION
INITIAL DEVELOPMENT OPERATIONS COORDINATION DOCUMENT
LEASE OCS-G 16890
ATWATER VALLEY BLOCK 261

APPENDIX A

CONTENTS OF PLAN

Description, Objectives, and Schedule

Anadarko Petroleum Corporation is the designated operator of OCS-G 16890 Atwater Valley Block 261. To date, one well has been drilled under an Initial Exploration Plan (Control Number N-7502) which was approved in September, 2002. The Atwater Valley Block 261 Well No. 1 Sidetrack 1 is currently temporarily abandoned.

A Conceptual Deepwater Operations Plan (DWOP) and Conservation Information Document are currently being prepared for submittal to MMS. A Preliminary DWOP was submitted May 20, 2005.

Under this DOCD, Anadarko will complete two wells, (Atwater Valley Block 261 Well No. 1 S/T 1 and proposed Well No. 2), install right-of-way and lease term pipelines with associated umbilicals, and place two wells on production from the sands as outlined in Appendix C of this DOCD. The host facility, Independence Hub, will be located in Mississippi Canyon Block 920, Offshore Alabama, and was provided for in the Atwater Valley Block 305 and 349 Initial DOCD.

The estimated date for commencement of production is July, 2007.

Location

Included as **Attachment A-1** is a map showing the locations of the wells and facilities. Additional well information is included in Appendix J on the Plan Information Form.

Drilling Unit

The proposed wells will be completed with the dynamically positioned (DP) drillship, Transocean SedcoForex's "Deepwater Millennium." For the purpose of the air quality review, the MMS maximum horsepower rating for a drillship will be used. Rig specifications will be made a part of the Applications for Permit to Modify.

These water depths require the latest state-of-the-art drilling/completion equipment. DP drillships are designed with double hulls and station-keeping systems to greatly minimize the chance of any problems associated with these vessels. Their storage capacities can reduce the number of loading/unloading cycles. Ships can be supplied at port and taken to location with sufficient supplies to complete multiple wells, if necessary.

Safety features on the drillship will include well control, pollution prevention, welding procedure, and blowout prevention equipment as described in Title 30 CFR Part 250, Subparts C, D, E, and G, and as further clarified by MMS Notices to Lessees, and current policy making invoked by the Minerals Management Service, the U.S. Environmental Protection Agency, and the U.S. Coast Guard. The appropriate life rafts, life jackets, ring buoys, etc., as prescribed by the U.S. Coast Guard, will be maintained on the facility at all times.

In accordance with Title 30 CFR Part 250, Subpart O, Anadarko will ensure employees and contract personnel engaged in well control operations understand and can properly perform these duties.

Pollution prevention measures include installation of curbs, gutters, drip pans, and drains on deck areas to collect all contaminants and debris.

The rig is not set up for zero discharge. For example, most deck drains and some of the joints at the edge of the rig floor go overboard or into the moonpool, respectively. There is a dedicated drip pan under the rotary table. The pipe racks, mud pump room, sack store, and drill floor drains go to a holding tank, which is served by a dedicated oily water separator. The well test area, engine room, and other major machinery spaces drains all go to slops tanks, which are served by a large general-service, oily water separator. The containment devices are temporary. They are not meant for permanent storage of waste. On the rare occasion that they contain wastes, they are pumped, mopped, or cleaned within a short period of time. The chances of damage to a containment structure during such time as it contains wastes are exceedingly small. The rig has a Shipboard Oil Pollution Emergency Plan (SOPEP), which is reviewed and approved annually by the American Bureau of Shipping (ABS). The rig carries sufficient materials to deal with a one-barrel oil spill.

Anadarko proposes additional measures for safety, pollution prevention, and early spill detection beyond those required by 30 CFR 250, as outlined in Section 6 of Anadarko's Sub-Regional Oil Spill Response Plan.

Production Facilities

Production from Atwater Valley Block 261 will be transported to Anadarko's proposed Independence Hub in Mississippi Canyon Block 920. The Independence Hub is a column-based semi-submersible type hull structure that will process production from deepwater subsea tie-ins. The structure will be affixed to the seafloor in Mississippi Canyon Block 920 and will accommodate up to 16 right-of-way pipelines from subsea wells, and a 20-inch export pipeline. Initially, there will be six subsea tie-backs and one export gas pipeline. The structure will have a two-level deck with an 850 MMSCFD gas processing topsides facility.

The platform has an operating draft of 105 feet; displacement of 50,000 tons; and will include 12 polyester mooring lines, connecting to the unit's 12 suction pilings. The mooring system will be designed with the capability to hold the facility on location in 100-year hurricane or 100-year loop current conditions while meeting code strength requirements.

All mooring system components will be designed for an operating life of 20 years. Design life calculations shall include consideration of corrosion and fatigue.

The Independence Hub facilities are designed for an operating life of 20 years. The structure will be classed by the American Bureau of Shipping (ABS) as an A1 Floating Offshore Installation (FOI).

Enterprise Field Services, LLC will install a 20-inch natural gas and condensate right-of-way pipeline which will depart Independence Hub and travel approximately 140 miles to a termination point at a proposed West Delta Block 68 platform. Production from the various fields' subsea tiebacks will be transported to Independence Hub via 10″ and 8″ natural gas and condensate right-of-way pipelines with associated umbilicals.

The facilities will be designed, installed and operated in accordance with current regulations, engineering documents incorporated by reference, and industry practice in order to ensure protection of personnel, environment and the facilities. When necessary, maintenance or repairs that are necessary to prevent pollution of offshore waters shall be undertaken immediately.

The pollution prevention measures for the Independence Hub Facility include installation of curbs, gutters, drip pans, and drains on deck areas to collect all contaminants and debris.

The facility is gas production only, with some associated condensate. The produced water will be separated from the condensate as an aqueous phase combined with monoethylene glycol (MEG). The MEG will be purified in a proprietary reclaiming system, with the result being pure produced water being discharged overboard. The produced water being discharged overboard will meet the overboard testing requirements for oil and grease toxicity.

The facility is not set up for zero discharge. For example, the deck drains are routed to two open drain sump piles for removal of hydrocarbons. The facility has a Shipboard Oil Pollution Emergency Plan (SOPEP) which is reviewed and approved annually by the American Bureau of Shipping. The facility will carry sufficient materials to deal with a one barrel oil spill.

Supervisory and certain designated personnel on-board the facility are to be familiar with the effluent limitations and guidelines for overboard discharges into the receiving waters as outlined in the NPDES General Permit GMG290000.

Production safety equipment was designed, and is installed, used, maintained, and tested in a manner to assure the safety and protection of the human, marine, and coastal environments in accordance with 30 CFR 250 Subpart H. Anadarko will perform all installation and production operations in a safe and workmanlike manner, and will maintain all equipment in a safe condition, thereby ensuring the protection of lease and associated facilities, the health and safety of all persons, and the preservation and conservation of property and the environment. The appropriate life rafts, life jackets, ring buoys, etc., as prescribed by the U.S. Coast Guard, will be maintained on the facility at all times.

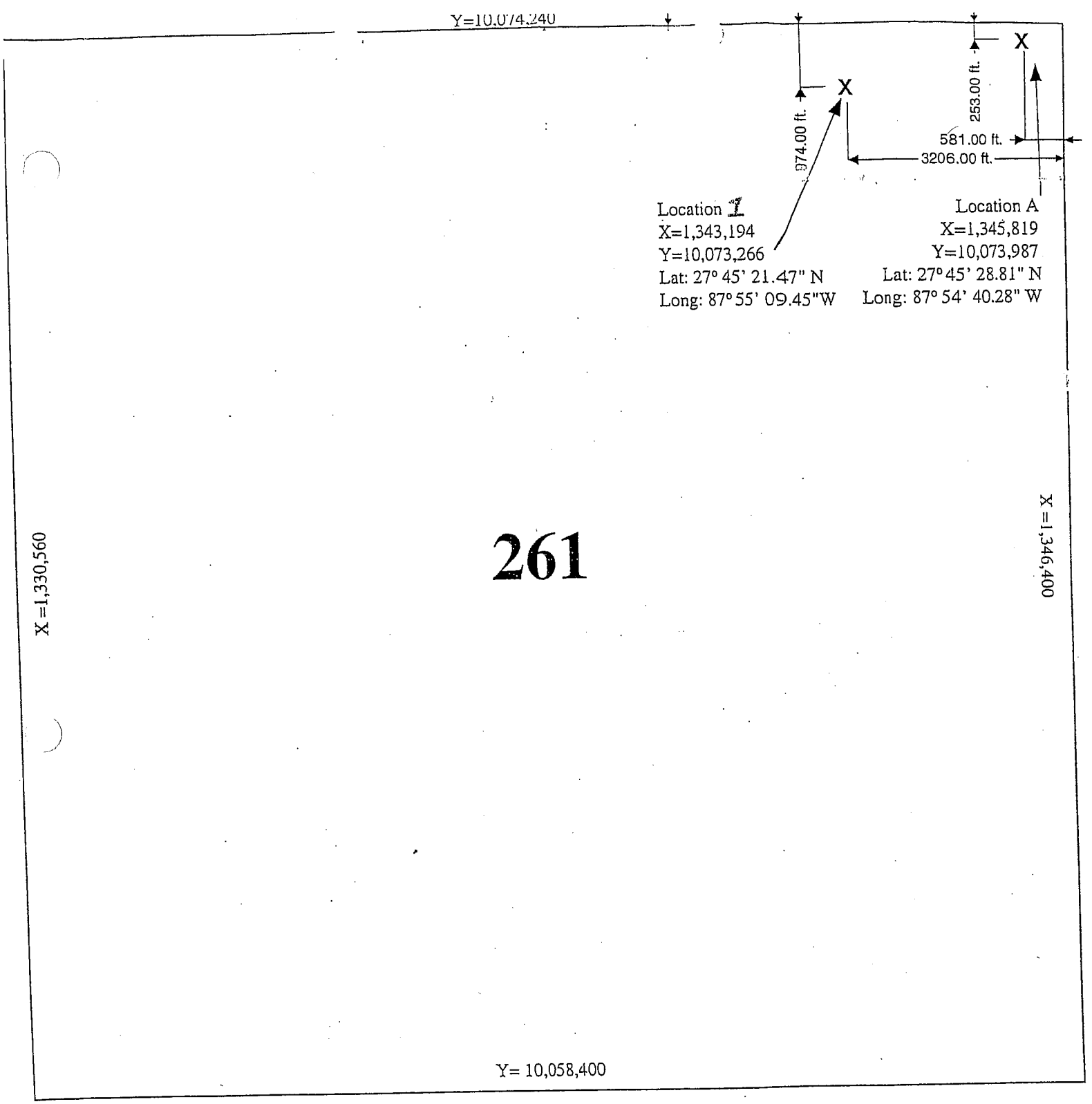
Any platform production facilities shall be protected with a basic and ancillary surface system designed, analyzed, installed, tested, and maintained in operating condition in accordance with the provisions of API RP 14C, Recommended Practice for Analysis, Design, Installation and Testing of Basic Surface Safety Systems for Offshore Production Platforms.

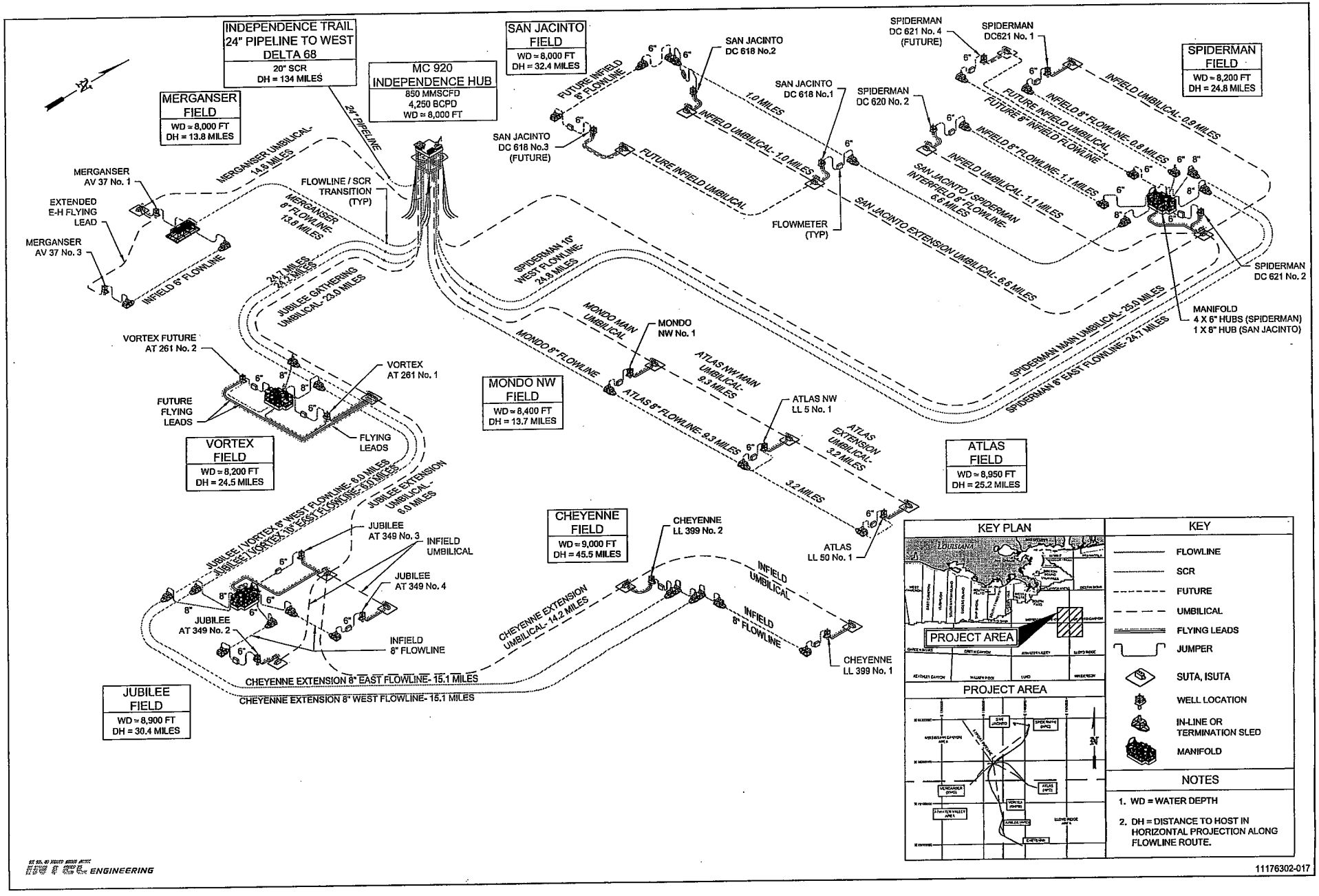
The Independence Hub is a manned structure, and will be identified and reported in accordance with the requirements of the U.S. Coast Guard and MMS.

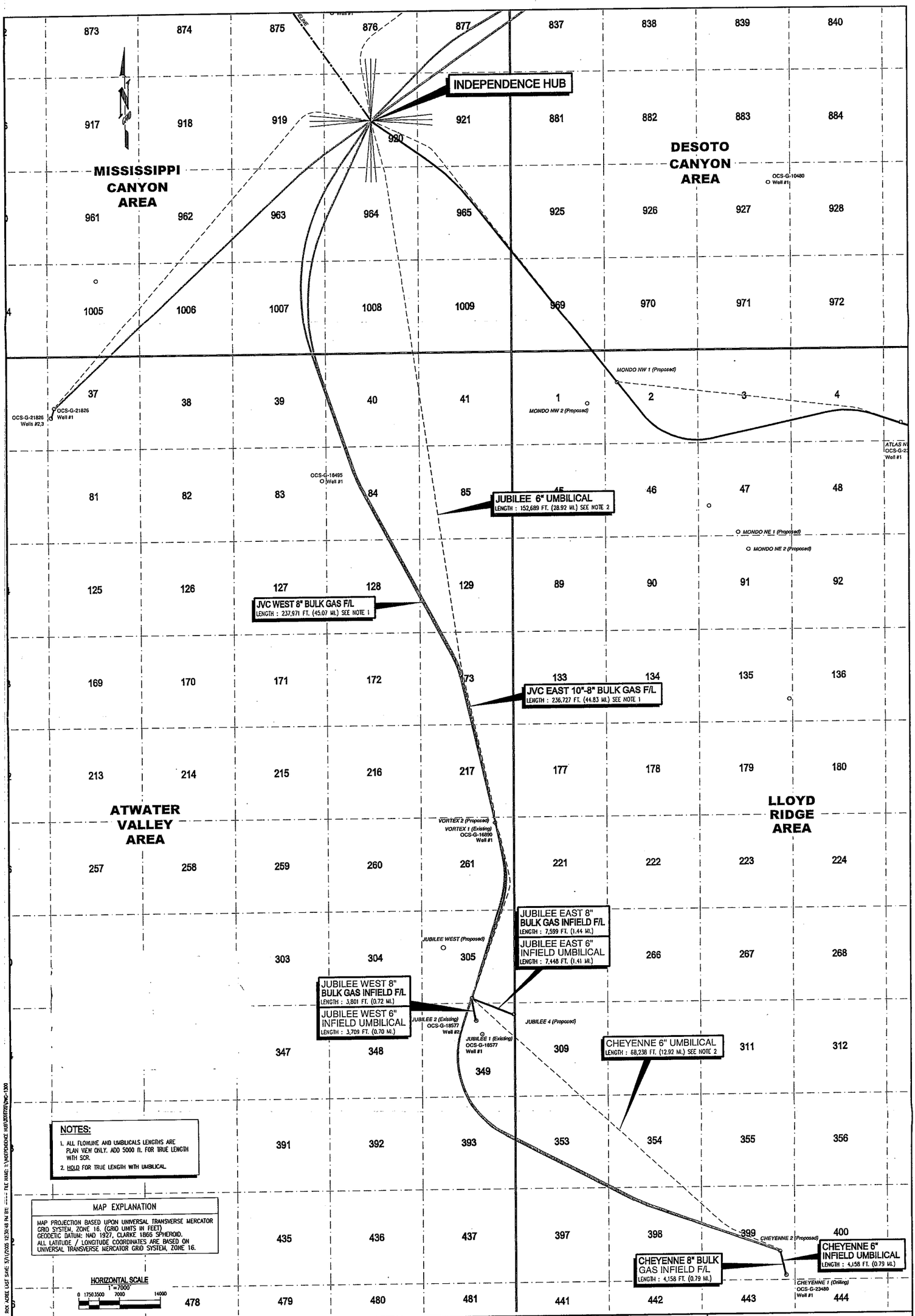
The trees and pipeline system will be installed by dynamically positioned vessels that do not require anchors. The entire subsea production system is depicted on Facilities Layout drawings included as **Attachment A-2.**

No new nearshore or onshore pipelines or facilities will be constructed.

The facilities will be designed, installed, and operated in accordance with current regulations, engineering documents incorporated by reference, and industry practice in order to ensure protection of personnel, environment, and the facilities. When necessary, maintenance or repairs that are necessary to prevent pollution of offshore waters shall be undertaken immediately.


Y=10,074,240
X
X
974.00 ft.
253.00 ft.
581.00 ft.
3206.00 ft.
Location 1
X=1,343,194
Y=10,073,266
Lat: 27° 45' 21.47" N
Long: 87° 55' 09.45"W
Location A
X=1,345,819
Y=10,073,987
Lat: 27° 45' 28.81" N
Long: 87° 54' 40.28" W
261
X =1,330,560
X =1,346,400
Y= 10,058,400
N
Federal Offshore Louisiana
Chinook Prospect
Atwater Valley
OCS-G 16890
Surface and Bottom Hole
Location
SCALE: 1" = 2000'
UTM, Zone 16


INDEPENDENCE TRAIL
24" PIPELINE TO WEST DELTA 68
20" SCR
DH = 134 MILES
MC 920
INDEPENDENCE HUB
850 MMSCFD
4,250 BCPD
WD = 8,000 FT
SAN JACINTO FIELD
WD = 8,000 FT
DH = 32.4 MILES
SPIDERMAN FIELD
WD = 8,200 FT
DH = 24.8 MILES
MERGANSER FIELD
WD = 8,000 FT
DH = 13.8 MILES
VORTEX FIELD
WD = 8,200 FT
DH = 24.5 MILES
MONDO NW FIELD
WD = 8,400 FT
DH = 13.7 MILES
ATLAS FIELD
WD = 8,950 FT
DH = 25.2 MILES
CHEYENNE FIELD
WD = 9,000 FT
DH = 45.5 MILES
JUBILEE FIELD
WD = 8,900 FT
DH = 30.4 MILES
24" PIPELINE
MERGANSER UMBILICAL- 14.8 MILES
MERGANSER AV 37 No. 1
EXTENDED E-H FLYING LEAD
MERGANSER AV 37 No. 3
INFIELD 6" FLOWLINE
MERGANSER 6" FLOWLINE- 13.8 MILES
FLOWLINE / SCR TRANSITION (TYP)
24.7 MILES
24.2 MILES
JUBILEE GATHERING UMBILICAL- 23.0 MILES
SPIDERMAN 10" WEST FLOWLINE- 24.8 MILES
FUTURE INFIELD 6" FLOWLINE
SAN JACINTO DC 618 No.2
SAN JACINTO DC 618 No.3 (FUTURE)
1.0 MILES
INFIELD UMBILICAL- 1.0 MILES
FUTURE INFIELD UMBILICAL
SAN JACINTO DC 618 No.1
FLOWMETER (TYP)
SAN JACINTO EXTENSION UMBILICAL- 6.6 MILES
SPIDERMAN DC 621 No. 4 (FUTURE)
SPIDERMAN DC621 No. 1
SPIDERMAN DC 620 No. 2
FUTURE INFIELD UMBILICAL
FUTURE 8" INFIELD FLOWLINE
INFIELD 8" FLOWLINE- 0.8 MILES
INFIELD UMBILICAL- 0.9 MILES
INFIELD UMBILICAL- 1.1 MILES
INFIELD 8" FLOWLINE- 1.1 MILES
SAN JACINTO / SPIDERMAN INTERFIELD 8" FLOWLINE- 8.6 MILES
SPIDERMAN DC 621 No. 2
MANIFOLD
4 X 6" HUBS (SPIDERMAN)
1 X 8" HUB (SAN JACINTO)
SPIDERMAN MAIN UMBILICAL- 25.0 MILES
SPIDERMAN 6" EAST FLOWLINE- 24.7 MILES
MONDO MAIN UMBILICAL
MONDO NW No. 1
MONDO 8" FLOWLINE
ATLAS NW MAIN UMBILICAL- 9.3 MILES
ATLAS 8" FLOWLINE- 9.3 MILES
ATLAS NW LL 5 No. 1
ATLAS EXTENSION UMBILICAL- 3.2 MILES
3.2 MILES
ATLAS LL 50 No. 1
VORTEX FUTURE AT 261 No. 2
VORTEX AT 261 No. 1
FUTURE FLYING LEADS
FLYING LEADS
JUBILEE EXTENSION UMBILICAL - 6.0 MILES
JUBILEE / VORTEX 8" WEST FLOWLINE- 6.0 MILES
JUBILEE / VORTEX 10" EAST FLOWLINE- 6.0 MILES
JUBILEE AT 349 No. 3
INFIELD UMBILICAL
JUBILEE AT 349 No. 4
JUBILEE AT 349 No. 2
INFIELD 8" FLOWLINE
CHEYENNE EXTENSION UMBILICAL- 14.2 MILES
CHEYENNE LL 399 No. 2
INFIELD UMBILICAL
INFIELD 8" FLOWLINE
CHEYENNE LL 399 No. 1
CHEYENNE EXTENSION 8" EAST FLOWLINE- 15.1 MILES
CHEYENNE EXTENSION 8" WEST FLOWLINE- 15.1 MILES
KEY PLAN
PROJECT AREA
PROJECT AREA
KEY
FLOWLINE
SCR
FUTURE
UMBILICAL
FLYING LEADS
JUMPER
SUTA, ISUTA
WELL LOCATION
IN-LINE OR TERMINATION SLED
MANIFOLD
NOTES
1. WD = WATER DEPTH
2. DH = DISTANCE TO HOST IN HORIZONTAL PROJECTION ALONG FLOWLINE ROUTE.
INTEC ENGINEERING
11176302-017



NOTES:

1. ALL FLOWLINE AND UMBILICALS LENGTHS ARE PLAN VIEW ONLY. ADD 5000 ft. FOR TRUE LENGTH WITH SCR.
2. HOLD FOR TRUE LENGTH WITH UMBILICAL.

MAP EXPLANATION

MAP PROJECTION BASED UPON UNIVERSAL TRANSVERSE MERCATOR GRID SYSTEM, ZONE 16. (GRID UNITS IN FEET)
GEODETIC DATUM: NAD 1927, CLARKE 1866 SPHEROID.
ALL LATITUDE / LONGITUDE COORDINATES ARE BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID SYSTEM, ZONE 16.

HORIZONTAL SCALE
1" = 7000'
0 1750 3500 7000 14000

NOTES:

NO.	DATE	BY	REVISION DESCRIPTION
A	05/11/05	RKA	ISSUED FOR REVIEW AND COMMENT

THE INFORMATION PROVIDED ON THIS DRAWING IS NOT TO BE ACCEPTED AS VALID UNLESS AN ORIGINAL PROFESSIONAL ENGINEER'S STAMP IS INCLUDED IN THE SPACE PROVIDED AND THE STAMP IS ACCOMPANIED BY THE ORIGINAL DATE AND SIGNATURE OF THE ENGINEER.

ENGINEER'S STAMP:

DRAWN BY: R. ACREE
DATE: 05/11/05
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PLOT SCALE: 1=7000
SCALE: 1"=7000'
SCALE VALID FOR D-SIZE DRAWING ONLY (22"x34")

INDEPENDENCE HUB

MC-920 INDEPENDENCE HUB DEVELOPMENT

JUBILEE, VORTEX & CHEYENNE OVERALL FIELD LAYOUT

JOB NO. 2016720 | DWG NO. 2016720-JVC-DWG-1300 | REV. A

PLOT: Thursday, May 11, 2005 10:26:17 PM BY: ---- FILE NAME: I:\INDEPENDENCE HUB\2016720\DWG\2016720-JVC-DWG-1300

MC-920 INDEPENDENCE HUB DEVELOPMENT

VORTEX
INFIELD LAYOUT

JOB NO. 2016720 | DWG NO. 2016720-JL-DWG-1303 | REV. A

INDEPENDENCE HUB

DRAWN BY: R. ACREE
DATE: 05/11/05
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PLOT SCALE: 1=20'
SCALE: 1"=20'
SCALE SHOWN IS FOR 24x36 DRAWING (NOT TO SCALE FOR 11x17)

ENGINEER'S STAMP:

NO.	DATE	BY	REVISION DESCRIPTION	ENGINEER
A.	05/11/05	RHA	ISSUED FOR REVIEW AND COMMENT	

THE INFORMATION PROVIDED ON THIS DRAWING IS NOT TO BE ACCEPTED AS VALID UNLESS AN ORIGINAL PROFESSIONAL ENGINEER'S STAMP IS INCLUDED IN THE SPACE PROVIDED AND THE STAMP IS ACCOMPANIED BY THE ORIGINAL SIGNATURE OF THE ENGINEER.

NOTES:

FLYING LEADS APPROX. 200'

FLYING LEADS APPROX. 200'

UMBILICAL SUTA
X =1343312.11'
Y =10073350.07'
LAT =27°45'22.194" N
LONG =87°53'8.155" W

UMBILICAL SDU
X =1343323.10'
Y =10073288.49'
LAT =27°45'21.712" N
LONG =87°53'8.000" W

UMBILICAL SUTA
X =1343333.91'
Y =10073227.03'
LAT =27°45'21.231" N
LONG =87°53'7.884" W

EAST INLINE PLET
X =1343278.59'
Y =10073350.43'
LAT =27°45'22.214" N
LONG =87°53'8.595" W

JUBILEE 6" UMBILICAL
BEARING: S 12° 37' 28" E

JVC EAST 10"- 8" BULK GAS FLOWLINE
FLOW
BEARING: S 12° 37' 28" E

JVC WEST 8" BULK GAS FLOWLINE
FLOW
BEARING: S 12° 37' 28" E

EAST INLINE VALVE
X =1343382.77'
Y =10073062.59'
LAT =27°45'17.494" N
LONG =87°53'7.253" W

WEST INLINE VALVE
X =1343301.14'
Y =10073089.17'
LAT =27°45'19.929" N
LONG =87°53'8.235" W

20.00 TYP.
20.00 TYP.
10.00 TYP.

TARGET BOX

WEST INLINE PLET
X =1343226.85'
Y =10073322.80'
LAT =27°45'22.805" N
LONG =87°53'9.088" W

8" MANIFOLD JUMPER (98' NOM.)
BEARING N 50° 32' 45" E

8" MANIFOLD JUMPER (98' NOM.)
BEARING: S 86° 27' 05" E

6" TREE JUMPER (61' NOM.)
BEARING: N 14° 20' 24" W

VORTEX MANIFOLD
X =1343176.49'
Y =10073358.35'
LAT =27°45'22.384" N
LONG =87°53'9.647" W

VORTEX WELL #1
X =1343194.26'
Y =10073285.46'
LAT =27°45'21.666" N
LONG =87°53'9.443" W

FLYING LEADS APPROX. 200'

FLYING LEAD APPROX. 500'

FLYING LEAD APPROX. 750'

GULF OF MEXICO
ATWATER VALLEY AREA
BLOCK 261

MAP EXPLANATION

MAP PROJECTION BASED UPON UNIVERSAL TRANSVERSE MERCATOR GRID SYSTEM, ZONE 16, (GRID UNITS IN FEET)
GEODETIC DATUM: NAD 1927, CLARKE 1866 SPHEROID
ALL LATITUDES AND LONGITUDES ARE BASED ON UNIVERSAL TRANSVERSE MERCATOR GRID SYSTEM, ZONE 16.

HORIZONTAL SCALE
1" = 20'
0 5 10 20 40

X=1343440'
X=1343400'
X=1343360'
X=1343320'
X=1343280'
X=1343240'
X=1343200'
X=1343160'
X=1343120'
X=1343080'

Y=10073440'
Y=10073400'
Y=10073360'
Y=10073320'
Y=10073280'
Y=10073240'
Y=10073200'
Y=10073160'
Y=10073120'
Y=10073080'
Y=10073040'
Y=10073000'
Y=10072960'
Y=10072920'
Y=10072880'
Y=10072840'

APPENDIX B
GENERAL INFORMATION

Contact

Inquiries may be made to the following authorized representative:

Anadarko Petroleum Corporation
Attention: Judy Davidson
P.O. Box 1330
Houston, Texas 77251-1330
(832) 636-8766
judy_davidson@anadarko.com

Project Name

Vortex

Production Rates and Life of Reservoir

Life of Reserves	Est peak production	Est average production	Type

New or Unusual Technology

Anadarko proposes to use carbon rod technology in the dynamic sections of the pipeline umbilicals. This is considered to be a new application of this technology. Due to the extreme water depths at the project location, tensions in the dynamic portions of the umbilicals are correspondingly high. Historically, in cases where additional strength was required, steel rods have been added to the cross-sections; however, this methodology is inefficient due to the weight-to-strength ratio of steel. For the umbilicals, carbon fiber rod strength members are incorporated into the umbilical cross-section design to augment the axial strength without adding significant weight.

Bonding Information

The bonding requirements for the activities and facilities proposed in this DOCD are satisfied by area wide bond, furnished and maintained according to 30 CFR 256, subpart 1; NTL No. N2000-G16, "Guidelines for General Lease Surety Bonds," dated September 7, 2000.

Anadarko Petroleum Corporation (MMS 00981) has demonstrated oil spill financial responsibility for the facilities proposed in this DOCD according to 30 CFR 253, and NTL No. 99-N01, "Guidelines for Oil Spill Financial Responsibility for Covered Offshore Facilities," dated January 6, 1999.

Onshore Base and Support Vessels

Atwater Valley Block 261 is located approximately 120 miles from the Louisiana coastline, 170 miles from Alabama, 165 miles from the onshore support base in Port Fourchon, Louisiana and 185 miles from the helicopter base in Galliano, Louisiana. A Vicinity Plat showing the location of Atwater Valley Block 261 is included as **Attachment B-1**.

The existing onshore base in Port Fourchon, Louisiana, provides 24-hour service, a radio tower with a phone patch, dock space, equipment, and supply storage area, drinking and drill water, etc. The base serves as a vessel loading point for tools, equipment, and machinery, and as temporary storage for materials and equipment. The proposed operations do not require expansion or major modifications to the base. No future acquisitions or expansions of onshore facilities are anticipated.

Support vessels and travel frequency during the proposed activities are as follows:

Support Vessels	Weekly Estimate (Number) of Roundtrips	
	Completion	Production Operations
Crew Boat	8	
Supply Boat	4	4
Helicopter	14	14

The most practical, direct route from the shore base as permitted by the weather and traffic condition will be utilized.

The crewboat will be used to carry smaller supplies, such as groceries, to the drillship. The supply boat will be used to carry pipe and bulk supplies. The boats will normally move to Atwater Valley via the most direct route from Port Fourchon, Louisiana.

Helicopters stationed in Galliano, Louisiana, will be used for transporting personnel and small supplies, and will normally take the most direct route of travel between the Galliano, Louisiana, and the Atwater Valley Area when air traffic and weather conditions permit.

Personal vehicles will be the primary means of transportation to carry rig personnel from various locations to the Galliano or Port Fourchon area.

Lease Stipulations

The following stipulations are attached to Lease OCS-G 16890, Atwater Valley Block 261.

Stipulation No. 1 – Military Warning Area – Hold and Save Harmless, Electromagnetic Emissions, and Operational Restrictions

Atwater Valley Block 261 is located within Eglin Water Test Area 1F (EWTA-1F). The Air Armament Center, 101 West D Ave., Suite 222, Eglin AFB, Florida 32542-5492, will be contacted in order to coordinate and control electromagnetic emissions, possible evacuations of personnel, and shut-in of operations during the proposed activities. Anadarko will notify the MMS and EWTA-1F, prior to conducting operations, of the person to be notified to implement the terms of this stipulation.

Stipulation No. 2 – Evacuation and Stipulation No. 3 – Coordination

These stipulations provide for evacuation of personnel and shut-in of operations during any events conducted by the military that could pose a danger to ongoing operations. Anadarko will notify the MMS and EWTA-1F, prior to conducting operations, of the person to be notified to implement the terms of this stipulation.

Stipulation No. 4 – Marine Protected Species

This stipulation is meant to reduce the potential taking of marine protected species. Anadarko will operate in accordance with NTL 2003-G10 to minimize the risk of vessel strikes to protected species and will report observations of injured or dead protected species. Anadarko will operate in accordance with NTL 2003-G11 to prevent intentional and/or accidental introduction of debris into the marine environment.

Related OCS Facilities and Operations

Two 6″ lease term pipelines will transport gas production from the subsea wellheads to a subsea manifold. The production will then be transported via proposed 8″ and 8″ x 10″ right-of-way pipelines approximately 20 miles in length to the floating offshore installation (FOI) located in Mississippi Canyon Block 920. The 8″ and 8″ x 10″ pipelines are designed to transport a maximum of 500 MMCFD per day. Actual production rates over the life of the reservoir are estimated to range from ___ MMCFD to ___ MMCFD. Shut-in time for the subsurface valve at the wellhead is 45 seconds. Shut-in time for the board valve is 45 seconds.

An electro-hydraulic steel tube (super duplex) umbilical, used to control and monitor the subsea facilities, will connect the subsea facilities to a Master Control Station on the Independence Hub in Mississippi Canyon Block 920. The main umbilical will end in a subsea termination assembly adjacent to the manifold location. From there, in-field umbilicals will connect to the in-field termination assemblies at the well locations.

The 8″ and 8″ x 10″ pipelines and associated control umbilicals will be permitted as right-of-way pipelines.

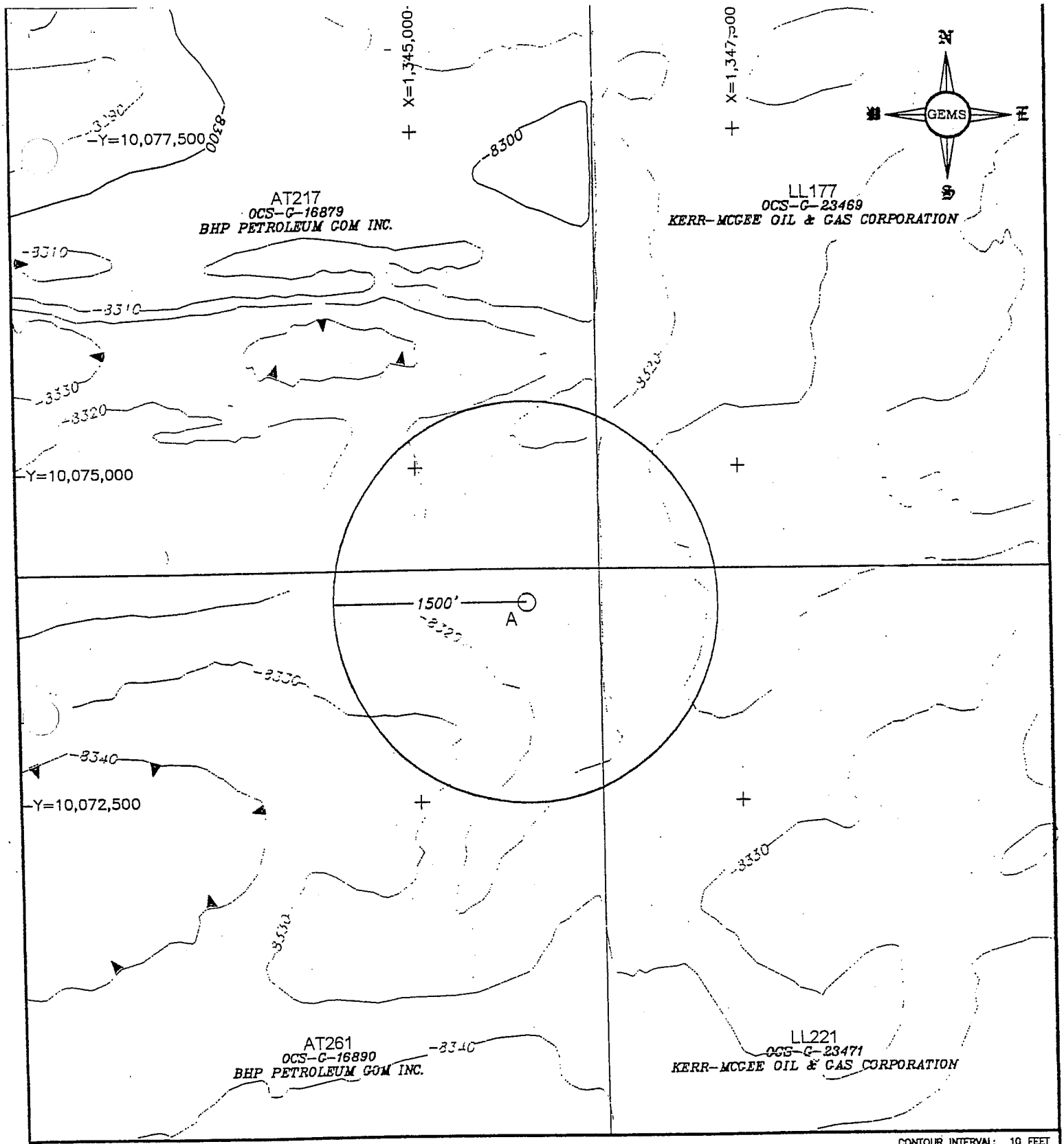
Transportation Information

The recombined gas and condensate will depart MC 920 Hub platform via a 20" pipeline, approximately 140 miles in length, and travel to a proposed valve platform located at West Delta Block 68.

Hydrocarbons will depart the West Delta Block 68 platform via a proposed 20" and 24" pipeline, respectively, to be installed by Tennessee Gas Pipeline. MMS approved the applications for both lines on March 29, 2005.

The 24" pipeline (segment number 15034) will terminate at a subsea tie-in on an existing Tennessee Gas line in Grand Isle Block 32, and be transported to an existing platform in Louisiana state waters. The 20" line (segment number 15033) will travel to the federal/state boundary line in West Delta Block 16 and continue to the aforementioned platform in Louisiana state waters.

Production will depart the existing platform in Louisiana state waters via a common line that terminates at Tennessee's onshore compression/separation/storage facility located at Port Sulphur, Louisiana.



FILE NAME: WELLA_2016BT_8X11.dwg

CONTOUR INTERVAL: 10 FEET

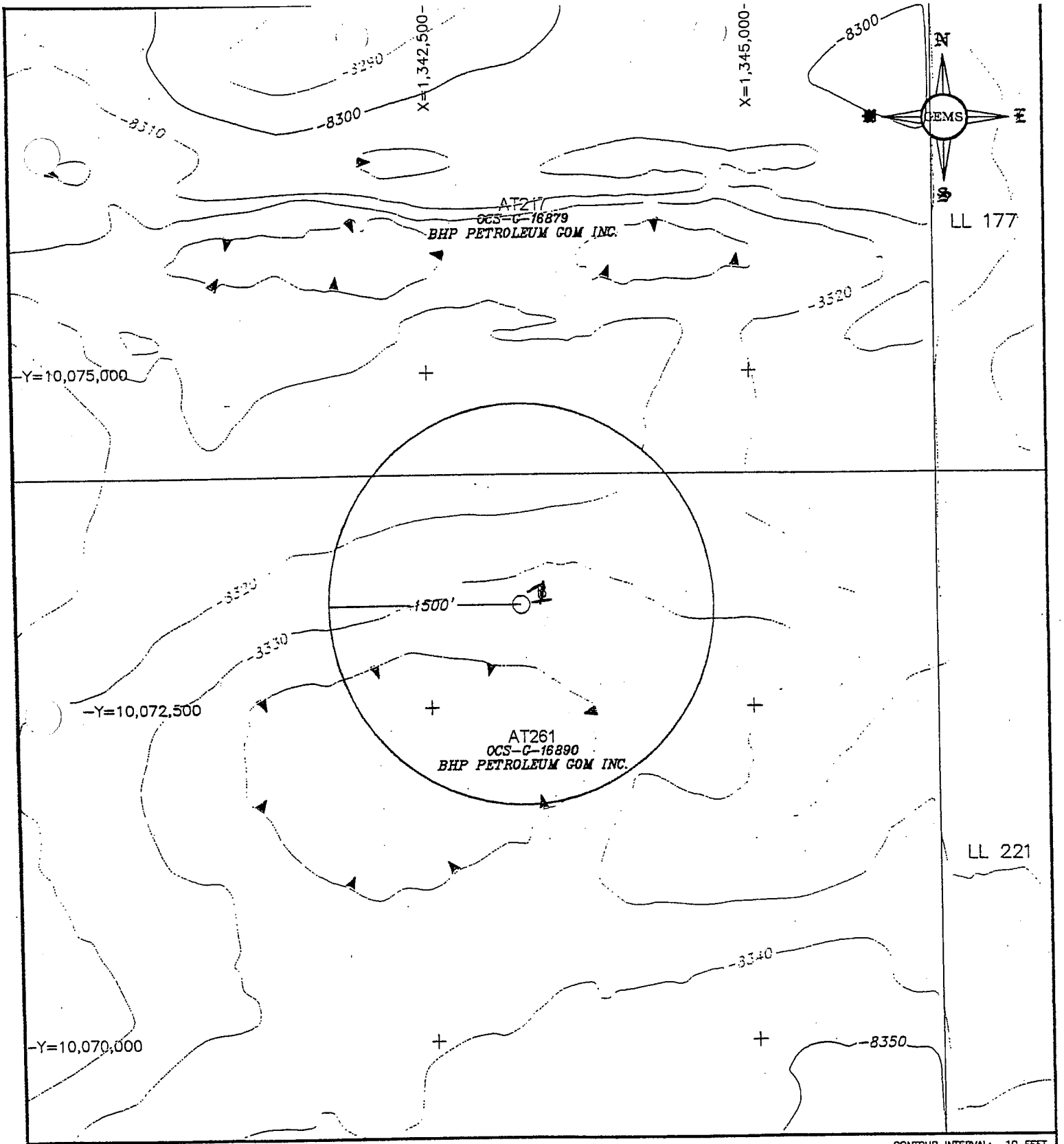
BHP BILLITON PETROLEUM (AMERICAS) INC.

0 500 1000 1500 2000

SCALE 1 : 12,000
SCALE 1" = 1000'

BATHYMETRY MAP
PROPOSED WELLSITE A
BLOCK 261
ATWATER VALLEY AREA

MAP NO. A-1



FILE NAME: WELLB_2016BT_BX11.dwg

CONTOUR INTERVAL: 10 FEET

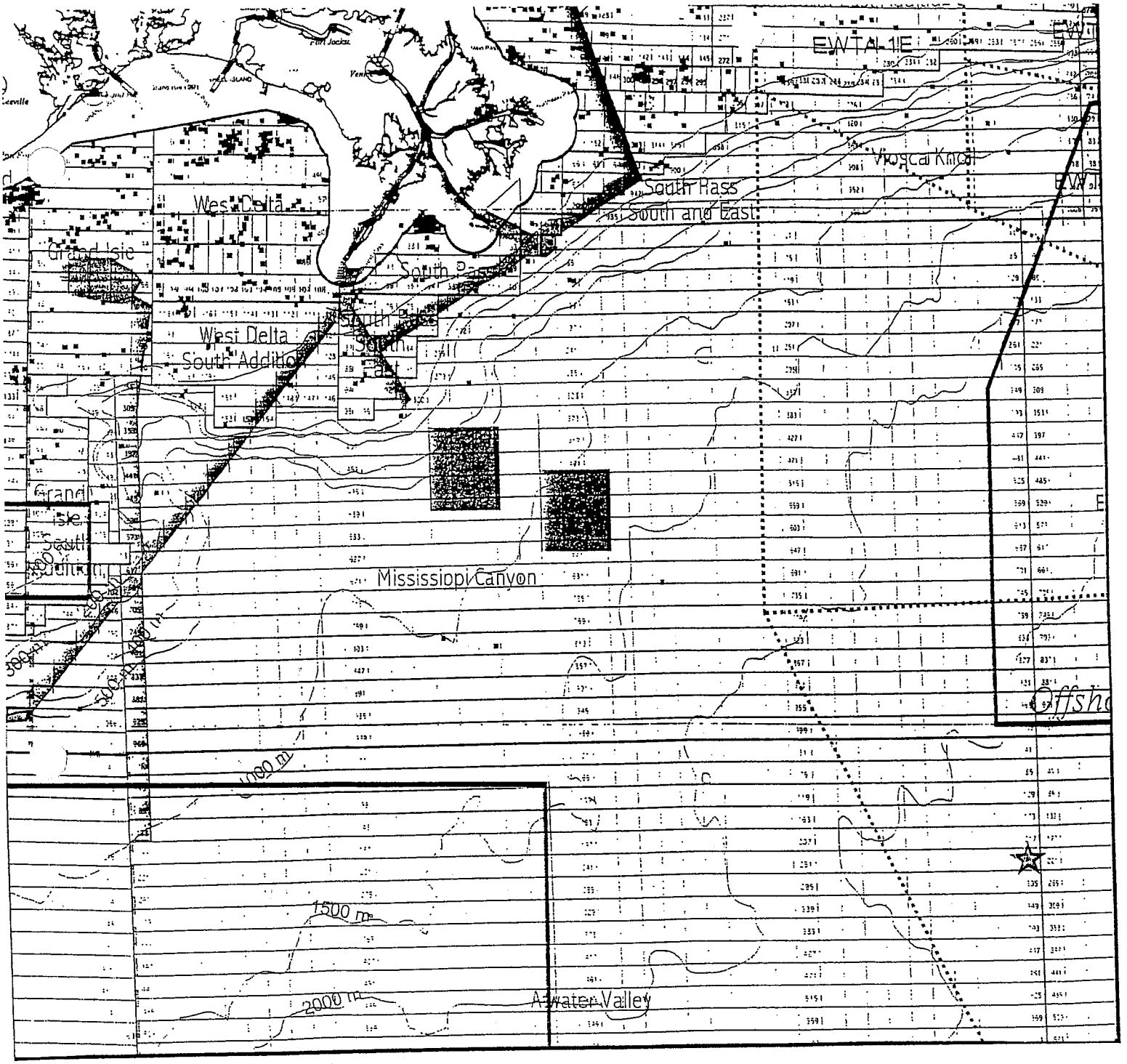
BHP BILLITON PETROLEUM (AMERICAS) INC.

0 500 1000 1500 2000

SCALE 1 : 12,000
SCALE 1" = 1000'

BATHYMETRY MAP
PROPOSED WELLSITE B
BLOCK 261
ATWATER VALLEY AREA

MAP NO. A-3



120 MILES FROM THE NEAREST LOUISIANA SHORELINE AND APPROXIMATELY 165 MILES FROM THE ONSHORE SUPPORT BASE LOCATED IN FOURCHON, LOUISIANA.

BHP PETROLEUM COMPANY, (GOM) INC.

ATWATER VALLEY BLOCK 261
VICINITY MAP

ATTACHMENT B-1

APPENDIX C
GEOLOGICAL, GEOPHYSICAL, AND H_2S INFORMATION

Structure Contour Maps

A current structure contour map drawn on the top of each prospective hydrocarbon sand, showing the entire lease block, the location of each proposed well, and the locations of geological cross-sections are included as **Attachment C-1**.

Interpreted 2-D and/or 3-D Seismic Lines

This information was submitted with the Initial Exploration Plan.

Geological Structure Cross-Sections

Not applicable for the proposed operations.

Shallow Hazards Report

A Shallow Hazards Report was previously submitted to MMS.

Shallow Hazards Assessment

The proposed operations will be conducted from previously approved surface locations.

High-Resolution Seismic Lines

The proposed operations will be conducted from previously approved surface locations.

Hydrogen Sulfide Information

MMS classified Atwater Valley Block 261 as "H_2S absent" by letter dated September 9, 2002.

APPENDIX D
BIOLOGICAL AND PHYSICAL INFORMATION

Chemosynthetic Information

Activities proposed in this DOCD could disturb seafloor areas in water depths of 400 meters (1,312 feet) or greater; therefore, information for the potential of encountering chemosynthetic communities is included as follows:

Maps

No new drilling operations are proposed in this DOCD. Maps prepared using 3-D seismic data depicting bathymetry, seafloor, shallow geological features, and a radius circle of 1,500 feet around each proposed location were submitted previously in the Shallow Hazards Survey Report.

Analysis

Using 3-D seismic information, all seafloor features and areas that could be disturbed by the activities proposed in this plan have been identified. The likelihood of these proposed activities disturbing these seafloor and shallow geologic features is discussed in the following summary statement:

Existing Well Locations:

No Associated Anchors – No Disturbances within 1,500 feet of Chemosynthetic Communities

- No drilling operations are proposed in this DOCD; therefore, there will be no discharges of mud and/or cuttings.
- Features or areas that could support high-density chemosynthetic communities are **not** located within 500 feet of the surface locations of existing wells, the site of installation of the subsea trees.

Lease Flowlines, Manifolds, and Jumpers:

No Associated Anchors – No Disturbances between 250 and 500 feet of Chemosynthetic Communities

- Features or areas that could support high-density chemosynthetic communities are **not** located within 250 feet of any seafloor disturbances resulting from construction of the proposed flowlines, manifolds, and jumpers.

Topographic Features Information

The activities proposed in this plan will not take place within 500 feet of any identified topographic feature. Anadarko will utilize a dynamically positioned rig to conduct the proposed completion operations. The activities proposed in this plan will not affect a topographic feature.

Live Bottom (Pinnacle Trend) Information

These leases do not contain Live Bottom (Pinnacle Trend) Stipulations.

Remotely Operated Vehicle (ROV) Surveys

MMS did not invoke the ROV survey requirement for Atwater Valley Block 261.

APPENDIX E
WASTES AND DISCHARGES INFORMATION

DISCHARGES

All discharges associated with development operations proposed in this plan will be in accordance with Minerals Management Service, U. S. Coast Guard and Environmental Protection Agency regulations.

Type of Waste	Amount to be Discharged	Maximum Discharge Rate	Treatment and/or Storage, Discharge Location and Discharge Method
Sanitary Wastes	233,600 gal/yr	640 gal/day	6″ overboard line hull southwest column (Note 1)
Domestic waste	1,226,400 gal/yr	3360 gal/day	6″ overboard line hull southwest column (Note 2)
Deck drainage	1,425,422 gal/yr	1,267,102 gal/day	2-66″ dia open drain sump caissons hull northeast and southwest columns (Note 3)
Uncontaminated fresh or seawater	18,250,000 gal/yr	5000 gal/min	16″ overboard caisson hull southwest column and 16″ overboard caisson hull southeast caisson (Note 4)
Desalinization Unit Water	5,533,400 gal/yr	15,160 gal/day	16″ overboard caisson hull southeast column (Note 5)
Uncontaminated bilge water	Up to 130 gpm into one sump pile	520 gal/min (emergency service only)	260 gal/min maximum only into each sump pile under emergency conditions. (Note 8)
Uncontaminated ballast water	2700 gal/min once a year for tank inspection	5400 gal/min (emergency service only)	Overboard discharge
Miscellaneous discharges to which treatment chemicals have been added	8,813,000,000 gal/year	29,376,000 gal/day	Seawater discharges to: 20″ overboard caisson on northwest hull column, 24″ overboard caisson northeast hull column and 16″ overboard caisson on southeast hull column (Note 6)
Well treatment workover or completion fluids	Workover – 300 bbl/well Treatment – 250 bbl/well Completion – 3000 bbl/well	300 bbl/well	Discharge used fluids overboard, return excess to shore for credit

Note 1: Based on 40 men occupancy, 365 days/yr @ 10 flushes/day at 1.6 gal/flush
Note 2: Based on 40 men occupancy, 365 days/yr and 100 gal fresh water/day total per man less sanitary usage
Note 3: Based on Houma, LA, annual rainfall of 54" and design rate of 2"/hr rate over main deck and hull columns with 10% coverage of production deck.
Note 4: Based on running both firewater pumps for 10 minutes per day 365 days per year, discharging 2500 gpm each overboard.
Note 5: Based on RO pump operating at 14 gpm, with 5000 gal/day fresh water production. Pump runs 365 days/yr.
Note 6: Based on 3-6800 gpm seawater lift pumps running 300 days per year
Note 7: Produced waters were included in the Atwater Valley Block 305/349 DOCD for the Independence Hub.
Note 8: Based on pumps in one active column running at full capacity. Pumps can be throttled to reduce flow as desired (air diaphragm pumps).

Disposal Table (Wastes to be Disposed of, Not Discharged)

Disposed wastes describe those wastes generated by the proposed activity that are disposed of by means other than by release into the water of the GOM at the site where they are generated. These wastes can be disposed of by offsite release, injection, encapsulation, or placement at either onshore or offshore permitted locations for the purposes of returning them back to the environment.

Type of Waste Approximate Composition	Amount*	Name/Location of Disposal Facility	Treatment and/or Storage, Transport and Disposal Method
Produced sand – Oil contaminated produced sand	400 bbls/y	Newpark Transfer Station (Venice, LA)	Transport in drums by vessel to shorebase for pickup.
Chemically treated Seawater/Freshwater – water to which chemical agents have been added.	20 bbl/well	U. S. Liquids, Fourchon, LA. or Newpark Environmental Services, Fourchon, LA.	Transport in barrels by vessel to shore base for pickup
Non-RCRA Exempt Solid Wastes/ Trash Plastic, paper, aluminum, food refuse	5 cubic meter/month	Galliano Waste Disposal, Galliano, LA. Or Waste Management, Raceland, LA.	Transport in disposal bags vessel to shore base for pickup by municipal operations
Other RCRA – Exempt Wastes in Quantities > 50 bbl/month	NA	NA	NA
Hazardous Wastes in Reportable Quantities	NA	NA	NA
Norm Contaminated Wastes	NA	NA	NA

*Can be expressed as a volume, weight, or rate

APPENDIX F
OIL SPILL INFORMATION

Regional OSRP Information

Anadarko is the only entity covered in their Regional Oil Spill Response Plan (OSRP) approved on November 10, 2003. Activities proposed in this DOCD will be covered by the Regional OSRP.

Oil Spill Response Organizations Information

Anadarko's primary equipment provider is Clean Gulf Associates (CGA). The Marine Spill Response Corporation's (MSRC) Spill Team Area Responders (STARS) contractor network will provide the closest available personnel, as well as an MSRC supervisor, to operate the equipment.

Worst-Case Scenario Comparison

Category	Regional OSRP WCD	DOCD WCD
Type of Activity	Production >10 miles	Production > 10 miles
Facility Location (Area/Block)	GC 608	MC 920
Facility Designation	Platform A	Platform A
Distance to Nearest Shoreline (miles)	120	90
Volume		
Storage Tanks (total)	2,675 bbls	455 bbls
Flowlines (on facility)	15 bbls	10 bbls
Pipelines	68.75 bbls	75 bbls
Uncontrolled Blowout	10,000 bbls	NA
Total Volume	12,758.75 bbls	540 bbls
Type of Oil(s) (crude, condensate, diesel)	Oil	Condensate
API Gravity	23	35

Category	Regional OSRP WCD	Proposed Activity WCD
Type of Activity	Production > 10 miles	Production > 10 miles
Spill Location	GC 608	AT 261
Facility Designation	Platform A	Wellbore
Distance to Nearest Shoreline	120	120
Volume		109 bbls (wellbore)
Storage Tanks	2,675 bbls	NA
Flowlines (on facility)	15 bbls	NA
Pipelines	68.75 bbls	1 bbl
Uncontrolled Blowout	10,000 bbls	NA
Total Volume	12,758.75 bbls	110 bbls
Type of Oil	Oil	Condensate
API Gravity	23	32.6-44.7

Anadarko has determined that the worst-case scenario from the activities proposed in this DOCD do not supercede the worst-case scenario for Green Canyon Block 608. A revised worst-case discharge for Green Canyon Block 608 is being submitted concurrently to MMS for approval in our OSRP for far-shore activities.

Since Anadarko Petroleum Corporation has the capability to respond to the worst-case spill scenario included in its Regional OSRP, and since the worst-case scenario determined for our DOCD does not replace the worst-case scenario in our Regional OSRP, I hereby certify that Anadarko has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in our DOCD.

Facility Tanks and Production Vessels

All facility tanks of 25 barrels or more:

Type of Storage Tank	Type of Facility	Largest Tank Capacity	Number of Tanks	Total Capacity	Fluid Gravity
Fuel Oil (Marine Diesel)	Drillship	13,812	11	37,896	32.4°
Production	Subsea to Host PF	NA			

Spill Response Sites

Primary Response Equipment Location	Preplanned Staging Location
Houma, Louisiana	Port Fourchon, Louisiana

Diesel Oil Supply Vessels

Fuel for the drillship will be transported via a supply vessel as follows:

a. Size of fuel supply vessel:	230 feet
b. Carrying capacity of fuel supply vessel:	309,270 gallons
c. Frequency that fuel supply vessel will visit the facilities:	once per week
d. Routes the fuel supply vessel will use to travel between the onshore support base and facility:	6 miles from Port Fourchon to the mouth of Bayou Lafourche, then direct route through the open Gulf to AT 261

Support Vessel Fuel Tanks

The estimated total storage capacity (maximum per class of vessel in the field at any given time) of fuel tanks on the vessels supporting activities in this Plan is as follows:

Types of Vessels	Number in Field Simultaneously	Estimated Maximum Fuel Tank Storage
a. Tug Boats	NA	NA
b. Supply Vessels	1	3,500
c. Service Vessels	1	800
d. Crew Vessels	1	1,500

Produced Liquid Hydrocarbons Transportation Vessels

Anadarko does not propose transfer of stored production and/or hydrocarbons from well testing activities under this DOCD.

Oil and Synthetic-Based Drilling Fluids

NA

Oils Characteristics

Chemical and physical properties of the condensates, originating from these extremely dry gas reservoirs, were difficult to accurately characterize in the laboratory due to the high contamination of drilling fluids in the reservoir fluid samples. The only reasonable measurement obtained was the API gravity of the condensate which was 32.6 to 44.7 API. Due to the high level of drilling fluid contamination in the fluid samples, flash point, pour point and viscosity measurements were not conducted. There were trace amounts of wax in the samples but measurable quantities were not attainable. Results from the reservoir fluid analysis suggest that the reservoirs are expected to yield less than 2 BBL/MMCF for the producing lives.

Anticipated Flash Stock Tank Liquid Analysis:

	Mole %	Weight
Hydrogen Sulfide	0.00	0.00
Carbon Dioxide	0.07	0.18
Nitrogen	0.30	0.49
Methane	99.15	93.53
Ethane	0.10	0.18
Propane	0.00	0.00
Iso-butane	0.00	0.00
n-butane	0.00	0.00
Iso-pentane	0.00	0.00
n-pentane	0.00	0.00
Hexanes	0.00	0.00
Heptanes Plus	0.38	5.62

Anticipated Properties of Flash Gas:

Gas Calculated Specific Gravity (Air=1)	0.556
Gas Heat of Combustion (Btu/cuft@60F) Dry	1007
Gas Heat of Combustion (Btu/cuft@60F)Wet	989
Gas Compressibility (@ 1atm & 60F) Z	0.998

Estimated Physical and Chemical Properties of Fuel Oil (No. 2 Diesel)

API Gravity: 32.4°
Viscosity: 2.7cSt @ 38° C
Flash Point: 66° C
Distillation Cuts:

Volume %	Temperature (°C)
1	66
5	205
10	218
50	263
90	317
95	331
99	352

Blowout Scenario

The worst-case discharge scenario for the Vortex field development project is defined as an uncontrollable discharge to the surface through the 5-1/2" work string during completion operations in the reservoir. Since the proposed producing reservoir is currently behind pipe, this occurrence would likely take place after perforating operations. Mechanically speaking, this scenario assumes that the pipe rams function on the sub-sea BOP stack, but that the shear/blind rams, internal BOP and TIW systems fail. This would allow full wellbore fluid to move up the drillpipe and flow to atmospheric pressure at the surface of the drillship rig floor. It is also assumed that, due to the high rate of production expected during the uncontrollable flow period, the well would experience a failed gravel pack and eventually sand up within a week after the

occurrence. The maximum condensate discharge is calculated to be 456 BCPD, or 3,192 barrels of condensate after a seven-day period.

Should a blowout occur, the formation types present in the GOM tend to bridge over in most cases. If the wellhead and BOP system are still in tact, wellbore intervention should be possible in as little as 7 to 10 days. In a relief well scenario, rig availability is typically not an issue. The time required to drill a relief well would be in the 30 to 60 day range depending on the well intersection depth.

Spill Response Discussion

For the purpose of NEPA analysis, the largest spill response originating from the proposed activity would be the loss of the largest diesel fuel storage tank from the drillship, or 13,812 barrels of diesel fuel with an API gravity of 32.4°. A discussion of the blowout scenario from this proposed activity is included in Anadarko's Regional OSRP.

Land Segment and Resource Identification

Trajectories of a spill and the probability of it impacting a land segment have been projected utilizing information in MMS Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on MMS website. The results are shown in the Table, Trajectory by Land Segment.

The MMS OSRAM identifies a one percent probability of impact to the shorelines of Plaquemines Parish, Louisiana within 10 days from Atwater Valley Block 261. Plaquemines Parish includes the Delta National Wildlife Refuge and Pass-A-Loutre Wildlife Management Area. The Delta National Wildlife Refuge consists of 48,000 acres of marshlands and open water. It primarily provides a winter sanctuary for migratory waterfowl and is home to many other birds, deer and alligators. The Pass-A-Loutre Wildlife Management Area consists of 66,000 acres and is accessible by boat only. This area consists of river channels, bayous and man-made canals. It is home to nutria, muskrat, mink, raccoon and otters, alligators and freshwater and saltwater fish. An additional discussion of protection strategies for potentially affected resources is included in Anadarko's Regional Oil Spill Response Plan.

Anadarko will make every effort to respond to the Worst Case Discharge as effectively as possible. A description of the response equipment available to contain and recover the Worst Case Discharge is shown in the Table, Equipment Response Time.

This table outlines equipment, personnel, materials and support vessels as well as temporary storage equipment to be considered in order to cope with an initial spill of 13,812 bbls. The list estimates individual times needed for procurement, load out, travel time to the site and deployment. If appropriate, 5 sorties (10,000 gallons) from the DC-4 and 10 sorties (10,000 gallons) from the DC-3s should disperse approximately 8,570 barrels of oil.

Offshore response strategies may also include attempting to skim utilizing the CGA HOSS barge, four (4) Fast Response Units (FRUs), with the total derated skimming capacity of 56,600 barrels. Temporary storage associated with the identified skimming equipment equals 4,930 barrels. If additional temporary storage is needed, a temporary storage barge may be mobilized.

SAFETY IS ANADARKO'S FIRST PRIORITY. AIR MONITORING WILL BE INITIATED AND OPERATIONS DEEMED SAFE PRIOR TO ANY CLEANUP, CONTAINMENT, OR SKIMMING OPERATIONS.

If the spill went unabated, shoreline impact in coastal environments would depend upon existing environmental conditions. Onshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom in vegetated areas. Strategies would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Strategies from the Southeast Louisiana Area Contingency Plans (ACP), and Unified Command would be consulted to ensure that environmental and special economic resources would be correctly identified and prioritized to ensure optimal protection. ACPs depict the protection response modes applicable for oil spill clean-up operations. Each response mode is schematically represented to show optimum deployment and operation of the equipment in areas of environmental concern. Supervisory personnel have the option to modify the deployment and operation of equipment allowing a more effective response to site-specific circumstances.

Trajectory By Land Segment

Trajectory of a spill and the probability of it impacting a land segment have been projected utilizing Anadarko Petroleum Corporation's WCD and information in MMS Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on MMS website using ten (10) day impact. The results are tabulated below.

Area/Block	OCS-G	Launch Area	Land Segment and/or Resource	Conditional Probability (%) within 10 days
Completion & Production 120 miles from shore	16890	C061	Plaquemines, LA	1

WCD Scenario – Production– BASED ON A SINGLE WELL BLOWOUT (120 miles from shore)

Equipment Response Time to: Atwater Valley Block 261

	EQUIPMENT TYPE	Derated Capacity (BBLS)	Storage (BBLS)	No. of Units	Owner/ Location	Initial Staging	Hours To Staging Area	TOTAL Time to Procure (1)	Time to Load Out (2)	Travel Time (Staging/ Spill) (3)	Time to Deploy (4)	TOTAL Estimated Response Time
A	DC 4 Spray Aircraft	--	--	1	ASI/HOUMA	HOUMA	0					
	DC 3 Spray Aircraft	--	--	1	ASI/HOUMA	HOUMA	0					
	Spotter Plane			1	ASI/HOUMA	HOUMA	0					
	Spotter Personnel			2	ASI/HOUMA	HOUMA	1	1	1	1	0	3
	Dispersant				CGA/HOUMA	HOUMA	0					
B	HOSS Barge	43,000	4,130	1	CGA/HOUMA	HOUMA	2	4	2	30	1	39
	Operators			12	STARS	HOUMA	2					
	Tugs			3	Vessel of Opportunity	HOUMA	4					
C	FRU/Expandi	6,800	400	2	CGA/Ft Jackson	VENICE	.5					
	Operators			12	STARS*	VENICE	2					
	Utility Boat			2	Vessel of Opportunity	VENICE	2	2	1	12	1	18
	Crew Boat			2	Vessel of Opportunity	VENICE	2					
D	FRU/Expandi	6,800	400	2	CGA/Pascagoula	PASCAGOULA						3
	Operators			12	STARS*	PASCAGOULA	.5					16
	Utility Boat			2	Vessel of Opportunity	PASCAGOULA	2	2	1	10	1	
	Crew Boat			2	Vessel of Opportunity	PASCAGOULA						
E	**INITIAL SUPPORT**											
	Spotter Helo	--	--	1	PHI/VENICE	SPILL SITE	1	1	--	1.5	--	3.5
	Surveillance Helo	--	--	1	PHI/VENICE	SPILL SITE	1	1	--	1.5	--	3.5
	Hand Held Radios	--	--		STARS*	VENICE CHARLES	1.5	1.5	--	1	--	4
	TOTAL	56,600	4,930									

*STARS contractor called out by MSRC

14. POLLUTION PREVENTION MEASURES

Safety, pollution, and early spill detection measures are discussed in Section 6 of Anadarko's Regional OSRP.

APPENDIX G
AIR EMISSIONS INFORMATION

Air Emissions Information

Screen Procedures for DOCD's	Yes	No
Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed exploration activities more than 90% of the amounts calculated using the following formulas: CT = $3400D^{2/3}$ for CO, and CT = 33.3D for the other air pollutants (where D = distance to shore in miles)?		X
Do your emission calculations include any emission reduction measures or modified emission factors?		X
Does or will the facility complex associated with your proposed development and production activities process production from eight or more wells?	X	
Do you expect to encounter H_2S at concentrations greater than 20 parts per million (ppm)?		X
Do you propose to flare or vent natural gas in excess of the criteria set forth under 250.1105(a)(2) and (3)?		X
Do you propose to burn produced hydrocarbon liquids?		X
Are your proposed development and production activities located within 25 miles from shore?		X
Are your proposed development and production activities located within 200 kilometers of the Breton Wilderness Area?		X

An Air Quality Review is enclosed as **Attachment G-1.**

This information was calculated by: Judy Davidson
Anadarko Petroleum Corporation
(832) 636-8766
judy_davidson@andarko.com

Based on this data, emissions from the proposed activities will not cause any significant effect on onshore air quality.

OMB Control No. 1010-0049
OMB Approval Expires: August 31, 2006

ALTERNATE EMISSION CALCULATIONS INCLUDING HUB INSTALLATION. GULF OF MEXICO AIR EMISSION CALCULATIONS

INSTRUCTIONS

General

This document (DOCD_AQ.XLS) was prepared through the cooperative efforts of those professionals in the oil industry including the API/OOC Gulf of Mexico Air Quality Task Force, and the Minerals Management service (MMS), who deal with air emission issues. This document is intended to standardize the way we estimate our potential air emissions for Development Operations Coordination Documents (DOCD) approved by the Minerals Management Service (MMS). It is intended to be thorough but flexible to meet the needs of different operators. This first file gives the basis for the emission factors used in the emission spreadsheet as well as some general instructions.
The following files, Title Sheet, Factors Sheet,Emissions Spreadsheet,and Summary Sheet will describe and calculate emissions from an activity.

Title Sheet

The Title Sheet requires input of the company's name, area, block, OCS-G number, platform and/or well(s) in the necessary lines. This data will automatically be transferred to the spreadsheet and summary sheet.

Factor Sheet

The emission factors were compiled from the latest AP-42 references or from industry studies if no AP-42 reference was available. Factors can be revised as more data becomes available. A change to this Factor Sheet will be automatically changed in Emission Spreadsheet. A sulfur content table was added in 1996. A change in this table will automatically revise the SOx factor which will revise emissions.

The basis for the factors is as follows:

1. NG Turbines — Fuel usage scf/hr = HP X 9.524 (10,000 btu/HP-hr / 1050 btu/scf)
2. NG Engines — Fuel usage scf/hr = HP X 7.143 (7,500 btu/HP-hr / 1050 btu/scf)
3. Diesel — Fuel usage gals/hr = HP X 0.0483 (7,000 btu/HP-hr / 145,000 btu/gal)

Emission Factors

Natural Gas Prime Movers

1. TNMOC refers to total non-methane organic carbon emissions and these can be assumed equivalent to VOC emissions.

2. The sulfur content assumed is 2000 grains /mmscf (3.33 ppm). If your concentration is different then revise the ppm in the sulfur able immediately below the factors table.

Diesel-Fired Prime Movers

1. Diesel sulfur level 0.4% by wt. If your sulfur content is different change % wt. in the sulfur table.

2. For boats use > 600 HP factors based on AP-42 Vol. II, Table II-3-3.
Those figures closely match the above values. Include the emissions from all vessels associated with your activities for their time of operation within a 25 mile radius of your facility.

3. For diesel engines <600 HP VOC emissions equal total HC emissions; for diesel engines>600 HP VOC emissions equal non-methane HC emissions.

Heaters/Boilers/Firetubes/NG-Fired

1. The assumed NG Sulfur content is 2000 gr. per mcf(3.33 ppm). You may revise the sulfur content by changing the ppm in the sulfur table, if your content is different.

2. The VOCs emissions are based on total non-methane HCs.

Gas Flares

1. It is assumed that the flare is non-smoking.

2. A heating value of 1050 btu/cu. ft. for NG is assumed.

3. The sulfur content assumed is 2000 grains /mmscf (3.33 ppm). If your concentration is different then revise the ppm in the sulfur table, or you may use the following formula:

   H2S flared (lbs/hr) = Gas flared (cu ft/hr) X ppm H2S X 34/(379X1000000)

   SOx emis (lbs/hr) = H2S flared (lbs/hr) X 64/34

Liquid Flares

1. Assumes 1% by wt Sulfur maximum in the crude oil. Revise the percent sulfur in the sulfur table if your value is different.

2. VOCs equal non-methane HCs

3. Particulate emissions assumes Grade 5 oil.

Tanks

1. Tank emissions assumes uncontrolled fixed roof tank.

2. The EPA TANKS model is an acceptable alternative. If you use TANKS you must provide sufficient information for MMS to verify your results.

Fugitives

1. Fugitives are based on the 1995 Star Environmental Report. It requires that you count or estimate your components.The factor is based on average leak rate for light oil / gas facility.

Glycol Dehydrator Vent

1. The rate of the gas being dehydrated (throughput) in SCF/HR must be entered in the spreadsheet. The emission factor is from the compilation of the Louisiana Survey and an average emissions per gas rate.

Gas Venting

1.The emission factor is based on venting unburned natural gas of average weight.

Emissions Spreadsheets (EMISSIONS1 through EMISSIONS5)

The emissions from an operation should be presented for a calendar year (1999, 2000, etc.). The operation may include production only or production in conjunction with other activities such as drilling or construction operations. For additional years the Emissions Spreadsheet is renamed Emissions 2, 3, etc. The different operating parameters for each year should entered to calculate revised emissions for that year. The spreadsheet will calculate maximum fuel usage (UNIT/HR) using the known horsepower. It will assume maximum fuel usage is equal to actual fuel (UNIT/DAY) usage unless the actual fuel usage is known. If so, insert actual fuel usage in appropriate column. The emissions will be calculated as follows:

Emission rate (lb/hr) = (HP or fuel rate) X Emission Factor (Potential to emit)

Emissions (tpy)=Emission rate (lb/hr) X load factor(Act Fuel/Max Fuel) X hrsX daysX ton/2000 lbs (Actual emissions)

To customize the spreadsheet for your application it is possible to delete lines for non-applicable

Also, the production equipment can be customized further by adding the use of the equipment behind each type of engine, i.e.,

Turbine
Turbine - Gas Compressor

Burner
Burner - Line Heater

Summary Sheet

The Summary Sheet is designed to show a proposed estimate of emissions from an activity over a future period of time. In this example ten years was chosen. The first line (Row 7) of the summary sheet is linked to the yearly totals in the Emissions1 Spreadsheet. The second line (Row 8) is referenced to Emissions2 Spreadsheet. The third line (Row 9) is referenced to Emissions3, Row 10 to Emissions 4, Row 11 to Emissions 5. If more years of calculations are necessary to reach a constant then a spreadsheet can be copied and linked to the summary sheet for future years. Once emissions are constant the values are carried to the end of the ten year period.

The **Paperwork Reduction Act of 1995** (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's DOCD submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget (OMB) control number. Responses are mandatory. The reporting burden for this form is included in the burden for preparing DOCDs. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining the data, and completing and reviewing the form. Direct comments on the burden estimate or any other aspect of this form to the Information Collection Clearance Office, Mail Stop 4230, Minerals Management Service, 1849 C Street, N. W., Washington, DC 20240.

DOCD AIR QUALITY SCREENING CHECKLIST

OMB Control No. 1010-0049
OMB Approval Expires: August 31, 2006

COMPANY	Anadarko Petroleum Corporation
AREA	Atwater Valley
BLOCK	261
LEASE	G16890
PLATFORM	MC 920 "A"
WELL	AT 261 Well No. 1 and No. 2
COMPANY CONTACT	Judy Davidson
TELEPHONE NO.	832-636-8766
REMARKS	Complete 2 wells and install two lease term pipelines.

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:

YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2005		
2006		
2007	2	10
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		

AIR EMISSION CUMPUTATION FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF.	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	1.468	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	1.468	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	2.42	0.84	0.008	0.21	AP42 1.3-12,14	9/98
NG Heaters/Boilers/Burners	lbs/mmscf	7.6	0.593	100	5.5	84	P42 1.4-1, 14-2, & 14	7/98
NG Flares	lbs/mmscf		0.593	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.83	2	0.01	0.21	AP42 1.3-1 & 1.3-3	9/98
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.0005		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Sulfur Content Source	Value	Units
Fuel Gas	3.33	ppm
Diesel Fuel	0.4	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

AIR EMISSION CALCULATIONS - FIRST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT		PHONE	REMARKS
Anadarko Petroleum Cor	Atwater Valley	261	G16890	MC 920 "A"	AT 261 Well No. 1 and No. 2		Judy Davidson		832-636-8766	#REF!

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION	PIPELINE LAY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel - Crane	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP <600 hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2005 YEAR TOTAL							0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											3996.00	3996.00	3996.00	3996.00	82717.95
	120.0															

AIR EMISSIONS CALCULATIONS - SECOND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL	CONTACT	PHONE	REMARKS
Anadarko Petroleum Corp	Atwater Valley	261	G16890	MC 920 "A"	AT 261 Well No. 1 and No. 2	Judy Davidson	832-636-8766	#REFI

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
COMPLETION	PRIME MOVER>600hp diesel	61800	2984.94	71638.56	24	80	43.56	199.83	1497.36	44.92	326.70	41.82	191.84	1437.46	43.12	313.63
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	3600	173.88	4173.12	6	92	2.54	11.64	87.22	2.62	19.03	0.70	3.21	24.07	0.72	5.25
	VESSELS>600hp diesel(supply)	3600	173.88	4173.12	10	46	2.54	11.64	87.22	2.62	19.03	0.58	2.68	20.06	0.60	4.38
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION	PIPELINE LAY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp position tug	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp position tug	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp position tug	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel (supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp tug barge piles	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp tug mooring	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp tug mooring	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel - crane	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2006	YEAR TOTAL						48.63	223.11	1671.81	50.15	364.76	43.10	197.73	1481.60	44.45	323.26
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											3996.00	3996.00	3996.00	3996.00	82717.95
	120.0															

AIR EMISSIONS CALCULATIONS - THIRD YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT			PHONE	REMARKS					
Anadarko Petroleum Corp	Atwater Valley	261	G16890	MC 920 "A"	AT 261 Well No. 1 and No. 2		Judy Davidson			832-636-8766	#REF!					
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
COMPLETION	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION	PIPELINE LAY BARGE diesel	54300	2622.69	62944.56	24	10	38.27	175.58	1315.64	39.47	287.05	4.59	21.07	157.88	4.74	34.45
	SUPPORT VESSEL diesel	3600	173.88	4173.12	24	10	2.54	11.64	87.22	2.62	19.03	0.30	1.40	10.47	0.31	2.28
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	3600	173.88	4173.12	24	3	2.54	11.64	87.22	2.62	19.03	0.09	0.42	3.14	0.09	0.69
Lease Term 2 Lines	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel (crane)	490	23.667	568.01	2	184	1.08	1.58	15.11	1.21	3.27	0.20	0.29	2.78	0.22	0.60
	RECIP.<600hp diesel (crane)	490	23.667	568.01	2	184	1.08	1.58	15.11	1.21	3.27	0.20	0.29	2.78	0.22	0.60
	RECIP.<600hp diesel (fire pump)	420	20.286	486.86	1	184	0.93	1.36	12.95	1.04	2.80	0.09	0.12	1.19	0.10	0.26
	RECIP.<600hp diesel (fire pump)	420	20.286	486.86	1	184	0.93	1.36	12.95	1.04	2.80	0.09	0.12	1.19	0.10	0.26
	RECIP.>600hp diesel (aux gen)	1316	63.5628	1525.51	24	12	0.93	4.26	31.89	0.96	6.96	0.13	0.61	4.59	0.14	1.00
	RECIP.>600hp diesel (emer gen)	843	40.7169	977.21	24	12	0.59	2.73	20.43	0.61	4.46	0.09	0.39	2.94	0.09	0.64
	SUPPORT VESSEL diesel	3600	173.88	4173.12	18	26	2.54	11.64	87.22	2.62	19.03	0.60	2.74	20.52	0.62	4.48
	TURBINE nat gas	12362	117735.69	2825656.51	24	184		0.07	35.40	0.27	22.60		0.15	78.16	0.60	49.90
	TURBINE nat gas	12362	117735.69	2825656.51	24	184		0.07	35.40	0.27	22.60		0.15	78.16	0.60	49.90
	TURBINE nat gas	12362	117735.69	2825656.51	24	184		0.07	35.40	0.27	22.60		0.15	78.16	0.60	49.90
	TURBINE nat gas	12362	117735.69	2825656.51	24	184		0.07	35.40	0.27	22.60		0.15	78.16	0.60	49.90
	TURBINE nat gas	12362	117735.69	2825656.51	24	184		0.07	35.40	0.27	22.60		0.15	78.16	0.60	49.90
	TURBINE nat gas	7700	73334.8	1760035.20	24	184		0.04	22.05	0.17	14.08		0.09	48.68	0.37	31.08
	TURBINE nat gas	7700	73334.8	1760035.20	24	184		0.04	22.05	0.17	14.08		0.09	48.68	0.37	31.08
	TURBINE nat gas	7700	73334.8	1760035.20	24	184		0.04	22.05	0.17	14.08		0.09	48.68	0.37	31.08
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT						0.00					0.00	
	TANK-	0			0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2007	YEAR TOTAL						51.42	223.83	1928.88	55.25	522.93	6.37	28.48	744.32	10.75	388.01
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											3996.00	3996.00	3996.00	3996.00	82717.95
	120.0															

AIR EMISSIONS CALCULATIONS - FOURTH YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL	CONTACT	PHONE	REMARKS
Anadarko Petroleum Corp	Atwater Valley	261	G16890	MC 920 "A"	AT 261 Well No. 1 and No. 2	Judy Davidson	832-636-8766	#REF!

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
PIPELINE INSTALLATION	PIPELINE LAY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel (crane)	490	23.667	568.01	2	156	1.08	1.58	15.11	1.21	3.27	0.17	0.25	2.36	0.19	0.51
	RECIP.<600hp diesel (crane)	490	23.667	568.01	2	156	1.08	1.58	15.11	1.21	3.27	0.17	0.25	2.36	0.19	0.51
	RECIP.<600hp diesel (fire pump)	420	20.286	486.86	1	52	0.93	1.36	12.95	1.04	2.80	0.02	0.04	0.34	0.03	0.07
	RECIP.<600hp diesel (fire pump)	420	20.286	486.86	1	52	0.93	1.36	12.95	1.04	2.80	0.02	0.04	0.34	0.03	0.07
	RECIP.>600hp diesel (aux gen)	1316	63.5628	1525.51	24	15	0.93	4.26	31.89	0.96	6.96	0.17	0.77	5.74	0.17	1.25
	RECIP.>600hp diesel (emer gen)	843	40.7169	977.21	24	15	0.59	2.73	20.43	0.61	4.46	0.11	0.49	3.68	0.11	0.80
	SUPPORT VESSEL diesel	3600	173.88	4173.12	18	52	2.54	11.64	87.22	2.62	19.03	1.19	5.46	40.93	1.23	8.93
	TURBINE nat gas	12362	117735.69	2825656.51	24	365		0.07	35.40	0.27	22.60		0.29	155.04	1.19	98.99
	TURBINE nat gas	12362	117735.69	2825656.51	24	365		0.07	35.40	0.27	22.60		0.29	155.04	1.19	98.99
	TURBINE nat gas	12362	117735.69	2825656.51	24	365		0.07	35.40	0.27	22.60		0.29	155.04	1.19	98.99
	TURBINE nat gas	12362	117735.69	2825656.51	24	365		0.07	35.40	0.27	22.60		0.29	155.04	1.19	98.99
	TURBINE nat gas	12362	117735.69	2825656.51	24	365		0.07	35.40	0.27	22.60		0.29	155.04	1.19	98.99
	TURBINE nat gas	7700	73334.8	1760035.20	24	365		0.04	22.05	0.17	14.08		0.18	96.57	0.74	61.66
	TURBINE nat gas	7700	73334.8	1760035.20	24	365		0.04	22.05	0.17	14.08		0.18	96.57	0.74	61.66
	TURBINE nat gas	7700	73334.8	1760035.20	24	365		0.04	22.05	0.17	14.08		0.18	96.57	0.74	61.66
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER nat gas															
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2008 - 2027	YEAR TOTAL						8.07	24.97	438.79	10.55	197.82	1.85	9.31	1120.67	10.13	692.07
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											3996.00	3996.00	3996.00	3996.00	82717.95
	120.0															

AIR EMISSION CALCULATIONS

OMB Control No. 10[illegible]-0049
OMB Approval Expires: August 31, 2006

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
Anadarko Petrol	Atwater Valley	261	G16890	MC 920 "A"	AT 261 Well No. 1 and

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2006	43.10	197.73	1481.60	44.45	323.26
2007	6.37	28.48	744.32	10.75	388.01
2008	1.85	9.31	1120.67	10.13	692.07
2009	1.85	9.31	1120.67	10.13	692.07
2010	1.85	9.31	1120.67	10.13	692.07
2011	1.85	9.31	1120.67	10.13	692.07
2012	1.85	9.31	1120.67	10.13	692.07
2013	1.85	9.31	1120.67	10.13	692.07
2014	1.85	9.31	1120.67	10.13	692.07
2015	1.85	9.31	1120.67	10.13	692.07
2016	1.85	9.31	1120.67	10.13	692.07
2017	1.85	9.31	1120.67	10.13	692.07
2018	1.85	9.31	1120.67	10.13	692.07
2019	1.85	9.31	1120.67	10.13	692.07
2020	1.85	9.31	1120.67	10.13	692.07
2021	1.85	9.31	1120.67	10.13	692.07
2022	1.85	9.31	1120.67	10.13	692.07
2023	1.85	9.31	1120.67	10.13	692.07
2024	1.85	9.31	1120.67	10.13	692.07
2025	1.85	9.31	1120.67	10.13	692.07
2026	1.85	9.31	1120.67	10.13	692.07
2027	1.85	9.31	1120.67	10.13	692.07
Allowable	3996.00	3996.00	3996.00	3996.00	82717.95

APPENDIX H
ENVIRONMENTAL IMPACT ANALYSIS (EIA)

Included in this section as **Attachment H-1** is the Environmental Impact Analysis prepared in accordance with Appendix H of Notice to Lessees (NTL 2002-G08).

APPENDIX I
CZM CONSISTENCY CERTIFICATION

The Louisiana Coastal Zone Management Program includes the following: general coastal use guidelines, levees, linear facilities (pipelines); dredged soil deposition; shoreline modifications, surface alterations, hydrologic and sediment transport modifications, waste disposal; uses that result in the alteration of waters draining into coastal waters; oil, gas, or other mineral activities; and air and water quality.

Relevant enforceable policies were considered in certifying consistency for Louisiana

The Alabama Coastal Zone Management Program includes the following: review of all coastal resource uses and activities that have a direct and significant effect on the coastal area. Uses subject to the Alabama CZM Program are divided into regulated and non-regulated categories. Regulated uses are those that have a direct and significant impact on the coastal areas. These uses require a State permit or are required by Federal law to be consistent with the management program. Uses that require a State permit must receive a certificate of compliance. Non-regulated uses are those activities that have a direct and significant impact on the coastal areas but do not require a State permit or Federal consistency certification. Non-regulated uses must be consistent with the ACAMP and require local permits to be administered by ADEM.

CZM Consistency Certifications for Louisiana and Alabama are enclosed as **Attachment I-1**.

APPENDIX H
ENVIRONMENTAL IMPACT ANALYSIS (EIA)

Included in this section as **Attachment H-1** is the Environmental Impact Analysis prepared in accordance with Appendix H of Notice to Lessees (NTL 2002-G08).

Environmental Impact Analysis

INITIAL DEVELOPMENT OPERATIONS
COORDINATION DOCUMENT
Atwater Valley Area
Block 261 (OCS-G 16890)

May 2005

Prepared for:

Judy Davidson
Anadarko Petroleum Corporation
1201 Lake Robbins Drive
The Woodlands, Texas 77380
Telephone: (832) 636-8766

Prepared by:

Continental Shelf Associates, Inc.
759 Parkway Street
Jupiter, Florida 33477
Telephone: (561) 746-7946

CONTENTS

A. IMPACT-PRODUCING FACTORS

This Environmental Impact Analysis (EIA) evaluates development activities by Anadarko Petroleum Corporation in Atwater Valley (AT) Block 261. The Initial Development Operations Coordination Document (DOCD) provides for the subsea completion of two wells, the installation of lease term pipelines with associated umbilicals, and the production of the two wells as detailed in ***DOCD Appendix A***. Production from AT 261 will be transported by two pipelines to Anadarko's proposed Independence Hub in Mississippi Canyon (MC) Block 920, a distance of approximately 20 miles.

Anadarko has applied for approval of the Independence Hub under a separate DOCD submitted for AT 305 and 349. Installation of two right-of-way pipelines and associated control umbilicals connecting AT 261 to the Independence Hub will be permitted under a separate pipeline application. The Independence Hub and right-of-way pipelines are discussed in this EIA for information only, as they are not part of the DOCD.

Completion activities are expected to begin in January 2006 and require 40 days per well. Independence Hub installation is scheduled to begin in July 2006, with commencement of production planned for July 2007. Dates are tentative, and some activities overlap other activities.

The lease area is approximately 120 miles from the nearest coastline (Louisiana), 170 miles from Alabama, and 180 miles from Florida. The block is located approximately 165 miles from the onshore support base at Port Fourchon, Louisiana, and 185 miles from the helicopter base in Galliano, Louisiana. Water depths in the lease area range from about 2,527 to 2,545 m (8,290 to 8,350 ft). The Independence Hub location in MC 920 is in a water depth of about 2,438 m (8,000 ft), 90 miles southeast of the Louisiana coastline.

Table 1 is a matrix of impact-producing factors (IPFs) and potentially affected environmental resources. The table is based on the matrix provided by the Minerals Management Service (MMS) at *http://www.gomr.mms.gov/homepg/regulate/regs/ntls/EIAWorksheet.pdf.*

An "X" in a particular table cell indicates that an IPF could affect a certain resource, and a dash (--) indicates no impact or negligible impact. Where there may be an effect, an analysis is provided in **EIA Section B**. For completeness, an "X" has been placed in the Accidents column for various coastal and other resources indicating potential impact, even though the detailed analysis indicates contact with spilled oil is unlikely. In accordance with MMS requirements, for those cells that are footnoted, a statement has been provided after the table as to the applicability of the proposed operations.

Table 1. Matrix of impact-producing factors and environmental resources.

Environmental Resources	Impact-Producing Factors						
	Physical Disturbances to the Seafloor	Presence of Structures	Air Emissions	Effluent Discharges	Marine Trash and Debris	Support Operations	Accidents
Site-Specific at Offshore Location							
Designated topographic features	--(1)	--	--	--(1)	--	--	--(1)
Pinnacle Trend area live bottoms	--(2)	--	--	--(2)	--	--	--(2)
Eastern Gulf live bottoms	--(3)	--	--	--(3)	--	--	--(3)
Chemosynthetic communities	--(4)	--	--	--	--	--	--
Water quality	--	--	--	X	--	X	X
Fisheries	--	X	--	--	--	--	X
Marine mammals	--	X(8)	--	--	X	X	X(8)
Sea turtles	--	X(8)	--	--	X	X	X(8)
Air quality	--	--	X(9)	--	--	X	X
Shipwreck sites (known/potential)	--(7)	--	--	--	--	--	--
Prehistoric archaeological sites	--(7)	--	--	--	--	--	--
Vicinity of Offshore Location							
Essential fish habitat	--	X	--	X	--	--	X(6)
Marine and pelagic birds	--	X	--	--	X	--	X
Public health and safety	--	--	--	--	--	--	--(5)
Coastal and Onshore							
Beaches	--	--	--	--	--	--	X(6)
Wetlands	--	--	--	--	--	--	X(6)
Shore birds & coastal nesting birds	--	--	--	--	--	X	X(6)
Coastal wildlife refuges	--	--	--	--	--	--	X(6)
Wilderness areas	--	--	--	--	--	--	X(6)
Other Resources							
Benthic communities	X	--	--	--	--	--	X
Pelagic communities	--	X	--	X	--	--	X
Gulf sturgeon (threatened fish)	--	--	--	--	--	--	X
Endangered beach mice	--	--	--	--	--	--	X
Economics and demographics	--	--	--	--	--	--	--
Land use	--	--	--	--	--	--	--
Recreation and tourism	--	--	--	--	--	--	--

Table Footnotes and Applicability:

(1) *Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the*
   (a) *4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;*
   (b) *1,000-m, 1-mile, or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features stipulation attached to an outer continental shelf (OCS) lease;*
   (c) *Essential Fish Habitat (EFH) criteria of 500 ft from any no-activity zone; or*
   (d) *Proximity of any submarine bank (500-ft buffer zone) with relief greater than 2 m that is not protected by the Topographic Features stipulation attached to an OCS lease.*

- This footnote is not applicable. The lease area is not within or near the stated distances of any topographic feature or no-activity zone. The geohazards evaluation indicates no submarine banks in the lease area.

(2) *Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) stipulation attached to an OCS lease.*

- The lease area is not covered by the Live Bottom (Pinnacle Trend) stipulation. The geohazards evaluation indicates no hard bottom features in the lease area.

(3) *Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low-Relief) stipulation attached to an OCS lease.*

- The Live Bottom (Low-Relief) stipulation applies to Eastern Planning Area leases in water depths of 100 m or less; therefore, the lease is not covered by this stipulation.

(4) *Activities on blocks designated by the MMS as being in water depths 400 m or greater.*

- The lease area is located in water depths of 400 m or greater. However, the chemosynthetic community evaluation indicates that the potential for significant chemosynthetic communities is very low. No impacts on chemosynthetic communities are anticipated.

(5) *Exploration or production activities where H_2S concentrations greater than 500 ppm might be encountered.*

- This footnote is not applicable because MMS determined AT 261 to be "H_2S absent" by letter dated 9 September 2002.

(6) *All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.*

- Accidental hydrocarbon spills could affect the resources marked (X) in the matrix, and impacts are analyzed in **EIA Section B**. Due to the distance from shore, the anticipated spill weathering characteristics, and spill response measures, impacts on beaches, wetlands, shore birds and coastal nesting birds, and other coastal resources are considered highly unlikely.

(7) *All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the MMS as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or prehistoric site that no impact would occur, the EIA can note that in a sentence or two.*

- AT 261 and MC 920 are not on the MMS list of blocks determined to have a high probability of archaeological resources. Therefore, no impacts on archaeological resources are expected.

(8) *All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.*

- IPFs that may affect marine mammals, sea turtles, or their critical habitats include marine trash and debris, support operations, and accidents (oil spills). Impacts are analyzed in **EIA Section B**.

(9) *Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.*

- This footnote is not applicable (no transportation of produced fluids to shore using shuttle tankers or barges).

IPFs applicable to the proposed activity include physical disturbances to the seafloor, presence of structures, air emissions, effluent discharges, marine trash and debris, support operations, and accidents.

A.1 PHYSICAL DISTURBANCES TO THE SEAFLOOR

The wells will be completed with a dynamically positioned (DP) drillship, Transocean SedcoForex's "Deepwater Millennium." There will be no anchoring during completion operations.

Installation of subsea facilities in AT 261 will disturb the seafloor. Facilities to be installed include two subsea well trees, a manifold, an umbilical termination assembly, and in-field flowlines and umbilicals. The subsea system will be installed by DP vessels that do not require anchors. According to MMS (2003a), installation of subsea infrastructure will cause bottom sediment disturbance in an area of about 2 ha per producing well. This would result in a total disturbed area of about 4 ha for the two wells in AT 261.

In terms of right-of-way pipelines, one 8-inch pipeline and an 8 x 10-inch pipeline will extend from the lease area to the Independence Hub, a distance of about 20 miles. A DP lay barge would be used to install pipelines using the J-lay method, and therefore there would be no anchoring. The MMS (2001c) estimates that 0.32 ha of seafloor is disturbed per kilometer of deepwater pipeline installed. Assuming a pipeline length of approximately 32 km (20 miles), the bottom area disturbed would be 10.2 ha.

In MC 920, a small area of seafloor would be disturbed by the 12 suction pilings used to moor the Independence Hub. It is assumed that the total area of seafloor disturbance will be a few hectares.

A.2 PRESENCE OF STRUCTURES

The DP drillship Transocean SedcoForex "Deepwater Millennium" will be temporarily on site in AT 261 during completion operations. Seafloor structures that will remain in place in the lease area for the lifetime of the project include well trees, a manifold, an umbilical termination assembly, and in-field flowlines and umbilicals. Structures outside the lease area will include the Independence Hub in MC 920 and right-of-way pipelines connecting the production wells to the Independence Hub. The Independence Hub in MC 920 will be a column-based semisubmersible type hull structure that will be affixed to the seafloor by 12 suction pilings.

In the upper water column, offshore structures will attract epipelagic fishes such as tunas, dolphin, billfishes, and jacks, which are commonly drawn to fixed and drifting surface structures (e.g., Holland et al., 1990; Higashi, 1994; Relini et al., 1994). At the seafloor, bottom-dwelling fishes and invertebrates may be attracted to the structure provided by subsea facilities, etc.

A.3 AIR EMISSIONS

DOCD Appendix G provides the Projected Air Quality Emissions Report prepared in accordance with MMS requirements. Included are drillship and support vessel emissions during completion operations, emissions from vessels (lay barge, tugs, support vessels) that will install subsea facilities in the lease area, and production-related emissions at the Independence Hub location. The projected annual emissions are below the exemption levels, and therefore no further analysis is required. A separate air quality calculation for the installation and operation of the Independence Hub has been submitted to the MMS in the DOCD for AT 305/349 and also shows projected emissions are below exemption levels.

A.4 EFFLUENT DISCHARGES

DOCD Appendix E summarizes wastes including quantities and methods of disposal. All offshore discharges will be in accordance with the National Pollutant Discharge Elimination System (NPDES) general permit issued by the U.S. Environmental Protection Agency (USEPA). Effluent discharges will include well completion fluids, sanitary and domestic wastes, deck drainage, uncontaminated freshwater or seawater, desalination brine, uncontaminated ballast and bilge water, and miscellaneous discharges.

Two other discharges are associated with the proposed action but are not included in ***DOCD Appendix E*** because they are covered under other permit applications. First, produced water discharges (if any) resulting from production in AT 261 would occur at the Independence Hub location and have been presented in the DOCD for AT 305/349. The discharges will be in accordance with NPDES permit requirements and are estimated to average 1,000 bbl/day. Second, following hydrostatic testing of the right-of-way pipelines, there will be a hydrotest discharge at the Independence Hub location. This discharge also will be in accordance with NPDES permit conditions.

A.5 MARINE TRASH AND DEBRIS

Solid waste is not expected to exceed 5 m^3 per month. Trash will be transported to shore and disposed of according to applicable regulations. Anadarko will adhere to MARPOL Annex V requirements, USEPA and U.S. Coast Guard (USCG) regulations, and MMS regulations and Notices to Lessees (NTLs) regarding solid wastes. MMS regulations prohibit operators from discharging containers and other similar materials (i.e., trash and debris) into the marine environment, and require durable identification markings on equipment, tools and containers (especially drums), and other material. USCG and USEPA regulations require that operators become proactive in avoiding accidental loss of solid waste items by developing waste management plans, posting informational placards, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. MMS NTL 2003-G11 instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires posting of placards at prominent locations on offshore vessels and structures, and requires a marine trash and debris awareness training and certification process.

A.6 SUPPORT OPERATIONS

Port Fourchon will serve as the primary base for supplies and crews for development operations. This base is located 165 miles from the project area. Helicopters will be dispatched from Galliano, Louisiana. Expected travel frequency is listed below:

Support Vessel	Weekly Estimate (no. of round trips)	
	Completion Operations	Production
Crew Boat	8	--
Supply Boat	4	4
Helicopter	14	14

A.7 ACCIDENTS

Under "Accidents," an H_2S release was not considered as an IPF because MMS determined AT 261 to be "H_2S absent." Only oil spills and chemical spills are considered.

Historical data suggest that a large spill is unlikely to occur as a result of well completion activities or hydrocarbon production associated with the project (Anderson and LaBelle, 2000; MMS, 2002). For impact analysis, a large oil spill was represented by the Worst Case Discharge (WCD), calculated in the DOCD as 456 bbl of condensate for a well blowout or 13,812 bbl of diesel fuel from the rupture of the largest tank on the drillship.

The Oil Spill Risk Analysis (OSRA) report by Ji et al. (2004) presents conditional probabilities of a spill contacting various shoreline segments. The results for Launch Area 61 (where AT 261 is located) and Launch Area 59 (where MC 920 is located) are presented in **Table 2**. There is no expected contact with any shorelines within 3 days, and the only potential shoreline contacts within 10 days are Plaquemines Parish, Louisiana (1 percent and 5 percent for a spill in AT 261 and MC 920, respectively) and LaFourche Parish, Louisiana (1 percent for a spill in MC 920). Because of weathering and spill response measures, a spill is unlikely to persist long enough to reach any shorelines. The impact analysis assumes that significant quantities of spilled hydrocarbons would not reach coastal areas.

Table 2. Conditional probabilities of a spill at the project area contacting shoreline segments, based on Oil Spill Risk Analysis (From: Ji et al., 2004). Values are probabilities (percent) that a hypothetical spill starting at AT 261 (represented by Launch Area 61) or MC 920 (represented by Launch Area 59) could contact shoreline segments within 3 or 10 days. Only segments with one or more non-zero values are listed.

Shoreline Segment	County or Parish and State	Conditional Probability of Contact[a]	
		3 days	10 days
Launch Area 61 (representing AT 261)			
C20	Plaquemines, LA	--	1
Launch Area 59 (representing MC 920)			
C18	LaFourche, LA	--	1
C20	Plaquemines, LA	--	5

[a] Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (-- indicates less than 0.5 percent).

B. ANALYSIS

B.1 SITE-SPECIFIC AT OFFSHORE LOCATION

B.1.1 Designated Topographic Features

(a) Routine Operations

There are no IPFs associated with routine operations that could cause impacts to designated topographic features. The lease area is not in or near an MMS-designated topographic feature or no-activity zone. The geohazards evaluation indicates no submarine banks in the lease area.

(b) Accidents

The nearest designated topographic feature is Sackett Bank, which is over 100 km from the project area. The Flower Garden Banks are over 500 km away. Due to the spill weathering and response efforts, a spill would be unlikely to reach the vicinity of any topographic feature. Further, since the crests of designated topographic features in the northern Gulf are at least 10 m below the sea surface, concentrated oil would not be expected to reach their sessile biota. No impacts would be expected.

B.1.2 Pinnacle Trend Area Live Bottoms

(a) Routine Operations

There are no IPFs associated with routine operations that could cause impacts to pinnacle trend live bottoms. The lease is not covered by the Live Bottom (Pinnacle Trend) stipulation. The geohazards evaluation indicates no hard bottom features in the lease area.

(b) Accidents

The pinnacle trend is along the shelf edge, about 150 km inshore of the lease area. Due to spill weathering and response efforts, a spill would be unlikely to reach the vicinity of the pinnacle trend area. Further, since the crests of pinnacle features are more than 50 m below the sea surface, concentrated oil would not be expected to reach their sessile biota. No impacts would be expected.

B.1.3 Eastern Gulf Live Bottoms

(a) Routine Operations

There are no IPFs associated with routine operations that could cause impacts to low-relief Eastern Gulf live bottoms. The Live Bottom (Low-Relief) stipulation applies to Eastern Planning Area leases in water depths of 100 m or less. The lease is not covered by this stipulation. The geohazards evaluation indicates no hard bottom features in the lease area.

(b) Accidents

The nearest live bottom areas as defined by MMS stipulation are inshore of the 100-m isobath, about 200 km from the project area. Because these are low-relief features on the seafloor, concentrated oil would not be expected to reach their sessile biota. No impacts would be expected.

B.1.4 Chemosynthetic Communities

(a) Routine Operations

There are no routine IPFs likely to cause impacts to chemosynthetic communities. There are no known chemosynthetic areas associated with AT 261. The shallow hazards report indicates that the area is clear of chemosynthetic communities. The seafloor appears to be void of geologic features that could support high-density chemosynthetic communities.

(b) Accidents

It is possible that undiscovered chemosynthetic communities exist in nearby deepwater lease blocks. However, a surface oil spill in the deepwater environment would not affect benthic communities, and a subsurface spill (e.g., a blowout) would be unlikely to affect benthic communities beyond a few hundred meters from the wellsite. Therefore, no impacts on chemosynthetic communities are likely.

B.1.5 Water Quality

(a) Routine Operations

Routine IPFs potentially affecting water quality include

- Effluent discharges; and
- Support operations.

Effluent Discharges. Effluent discharges affecting water quality include produced water, sanitary and domestic wastes, deck drainage, uncontaminated freshwater or seawater, desalination brine, uncontaminated ballast and bilge water, and miscellaneous discharges.

Produced water can have high total suspended solids, salinities, levels of organic carbon, metal content, and can be very low in dissolved oxygen (Neff, 1987). Because these waters are closely intermingled with petroleum, they contain variable concentrations of hydrocarbons, which are required to be separated before discharge. Produced water discharges in accordance with NPDES permit requirements are expected to be diluted rapidly, resulting in minor, localized changes in water quality parameters.

Sanitary and domestic wastes will have a slight effect on water quality in the immediate vicinity of these discharges. Sanitary and domestic wastes may have elevated levels of nutrients, organic matter, and chlorine but should be diluted rapidly to undetectable levels within tens to hundreds of meters of the source. Minimal impacts on water quality are anticipated from these discharges in accordance with NPDES permit requirements.

Deck drainage includes all effluents resulting from rain, deck washings, and runoff from curbs, gutters, and drains, including drip pans in work areas. Rainwater that falls on the uncontaminated areas of the Independence Hub will flow overboard without treatment.

However, rainwater that falls on the deck and other areas such as chemical storage areas and places where equipment is exposed will be collected and treated in an oil/water separator to meet NPDES permit requirements. Little or no impact on water quality is anticipated.

Other discharges in accordance with the NPDES permit, such as uncontaminated freshwater or seawater, desalination brine, uncontaminated ballast and bilge water, and miscellaneous discharges are expected to be diluted rapidly and have little or no impact on water quality.

Support Operations. Support vessels will discharge treated sanitary and domestic wastes. These will have a slight effect on water quality in the immediate vicinity of these discharges. Sanitary and domestic wastes may have elevated levels of nutrients, organic matter, and chlorine but should be diluted rapidly to undetectable levels within tens to hundreds of meters of the source. Minimal impacts on water quality are anticipated from these discharges in accordance with USCG requirements.

(b) Accidents

A spill in offshore waters would produce a slick on the water and temporarily increase hydrocarbon concentrations. The OSRA modeling indicates no contacts with shorelines within 3 days after a spill and a very small probability of contacting any shoreline within 10 days. During this time, it is assumed that most or all of the spill volume would be removed due to spill weathering and response measures. Therefore, no significant impacts on coastal water quality would be likely.

A small chemical spill could produce short-term, localized impacts on water quality. Depending upon the chemical spilled and its solubility in seawater, chemicals will either be diluted, dissolved, or remain insoluble and disperse once they reach the sea surface or come in contact with seawater. The consequence of a spill of any of the chemicals in the chemical inventory would be dependent on the type and volume of chemicals released. A short-term, localized reduction in water quality might be expected.

B.1.6 Fisheries

The main commercial fishing activity in deep waters of the northern Gulf of Mexico is pelagic longlining for tuna, swordfish, and other billfishes (Continental Shelf Associates, Inc., 2002). Pelagic longlining has occurred historically in the project area, primarily during spring and summer.

Longline gear consists of monofilament line that is deployed from a moving vessel and generally allowed to drift for 4 to 5 hours (Continental Shelf Associates, Inc., 2002). As the mainline is put out, baited leaders and buoys are clipped in place at regular intervals. It takes 8 to 10 hours to deploy a 70-km longline and about the same time to retrieve it. Longlines are often set near oceanographic features such as fronts or downwellings, with the aid of sophisticated on-board temperature sensors, depth finders, and positioning equipment. Vessels are 10 to 30 m long, and their trips last from about 1 to 3 weeks. The main homeports for longlining vessels are Dulac and Venice, Louisiana; and Destin, Madeira Beach, and Panama City, Florida.

It is unlikely that any commercial fishing activity other than longlining is occurring at or near the project area. Benthic species targeted by commercial fishers occur on the upper continental slope, well inshore of the project area. Royal red shrimp are caught by trawlers in water depths of about 250 to 550 m. Tilefish are caught by bottom longlining in water depths from about 165 to 450 m (Continental Shelf Associates, Inc., 2002).

Most recreational fishing activity in the northeastern Gulf occurs in depths less than about 200 m (Continental Shelf Associates, Inc., 1997, 2002). In deeper water, the main attraction is petroleum platforms. Due to the distance from shore and the relatively small number of offshore structures, it is unlikely that any recreational fishing activity is occurring in the project area.

(a) Routine Operations

Presence of structures is the only IPF that may have an impact on commercial fishing activity. There is a slight possibility of pelagic longlines becoming entangled with an offshore structure. For example, in January 1999, a portion of a pelagic longline snagged on the acoustic Doppler current profiler of a dynamically positioned drillship working in the Gulf of Mexico (Continental Shelf Associates, Inc., 2002). The line was removed without incident. Generally, longline fishers use radar and are aware of offshore structures and ships when placing their sets. Therefore, little or no impact on pelagic longlining is expected.

As it is unlikely that any recreational fishing activity is occurring in the project area, no adverse impacts are anticipated. A minor beneficial impact is possible if recreational fishers are attracted to the Independence Hub.

Other factors such as effluent discharges are likely to have negligible impacts on commercial or recreational fisheries due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

(b) Accidents

Pelagic longlining activities could be temporarily disrupted in the event of a large spill in the project area. The area affected would be relatively small, and the duration presumably would be a few days, based on the anticipated weathering characteristics and spill response capabilities.

It is unlikely that any recreational fishing activity is occurring in the project area due to the distance from shore. Due to spill weathering and response measures, no disruption of commercial or recreational fishing activities in coastal waters would be expected.

B.1.7 Marine Mammals

(a) Routine Operations

Routine IPFs potentially affecting marine mammals include

- Presence of structures (noise and lights);
- Marine trash and debris; and
- Support operations.

Other factors such as effluent discharges are likely to have negligible impacts on marine mammals due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

The only endangered marine mammal potentially present at the project area is the sperm whale. The project area is near a region where sperm whales are frequently sighted, in the Mississippi Canyon area (Davis et al., 2000). The most common nonendangered cetaceans in the deepwater environment are odontocetes such as pantropical spotted dolphin, spinner dolphin, and clymene dolphin. Other odontocetes that may be present include dwarf and pygmy sperm whales, four species of beaked whales, and several other species of dolphins and porpoises (MMS, 2002, 2004).

The Florida manatee is a coastal species that does not occur in the project area. Manatees sometimes occur in Louisiana coastal waters (where the shore base is located) during summer months, and vessel strikes are a major cause of manatee mortality in peninsular Florida, where most of the manatee population is located. Florida manatees are not likely to be adversely affected by oil and gas activities in the area (U.S. Fish and Wildlife Service [USFWS], 2001). Routine activities are not expected to have any impacts on manatees, and they are not discussed further.

Presence of Structures (noise and lights). Sperm whales may or may not avoid the project area. Noise associated with OCS activities is of relatively low frequency, typically between 4.5 to 30 Hz (Richardson et al., 1995). The sperm whale appears to have good low frequency hearing, but the available data do not indicate a consistent response to anthropogenic noise (National Marine Fisheries Service [NMFS], 2002). Sperm whales have been known to stop echolocating or vocalizing when disturbed by certain low frequency sounds. Noise associated with drilling is relatively weak in intensity, and individual sperm whales' noise exposure would be transient. There is already considerable offshore oil and gas activity in nearby regions of the central Gulf, including drilling and production operations, support vessel and helicopter activity, and seismic surveys.

Other cetaceans may or may not avoid the project area due to noise. Most odontocetes have their best hearing in high frequencies and are less likely to be disturbed by low frequency noise. Noise associated with drilling is also relatively weak in intensity, and marine mammals' exposure to these sounds would be transient.

Marine Trash and Debris. Ingestion of, or entanglement with, accidentally discarded debris can kill or injure marine mammals. The disposal of solid waste from drilling rigs and vessels is prohibited by the MMS and the USCG under MARPOL regulations. In addition, MMS has issued NTL 2003-G11, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires posting of placards at prominent locations on offshore vessels and structures, and requires a marine trash and debris awareness training and certification process. Compliance with this NTL and any related MMS requirements is assumed to be effective in minimizing the potential for debris-related impacts on marine mammals.

Support Operations. Vessel and helicopter traffic may startle or disturb marine mammals. Reactions may range from apparent indifference to evasive moves (e.g., turns, diving, etc.). Many of the reactions of marine mammals to vessel traffic appear to be primarily a result of noise, though there may be visual or other cues as well.

There is a small risk of a supply or crew boat striking a sperm whale. There have been reports of sperm whales deaths attributed to striking the propeller of a vessel (NMFS, 2002). Sperm whales are found within oceanic waters and are therefore more likely to encounter vessels traveling at high speeds, both during daylight and nighttime hours. Although sperm whales are capable of avoiding these vessels, it is possible that collisions may occur under certain circumstances. For example, sperm whales periodically spend extended periods of time (up to 30 minutes) to restore oxygen levels within their tissues after deep dives. The most likely impact on sperm whales would be vessel avoidance rather than collision.

To reduce the potential for vessel strikes, the MMS has issued NTL 2003-G10, which recommends protected species identification training, specifies ways for vessel operators and crews to avoid vessel strikes, and requires operators to report sightings of any injured or dead protected species. Compliance with this NTL and any related MMS requirements is assumed to be effective in minimizing the likelihood of vessel strikes.

(b) Accidents

Sperm Whale (endangered species). The sperm whale is the only endangered marine mammal likely to be affected by an oil spill at the project area. Sperm whales are widely distributed in the Gulf of Mexico, but concentrations occur in the Mississippi Canyon area south of the Mississippi River Delta (Davis et al., 2000). Though the areas of sperm whale concentrations are relatively small, it is possible that a spill could reach areas frequented by sperm whales prior to weathering. The total area of a slick is expected to be small relative to the available deepwater habitat. Oil exposure would not persist in the open ocean, and the animals could avoid oiled areas. Although a spill could contact sperm whales, primarily sublethal effects are expected due to avoidance and natural dispersion/weathering of the spill in the offshore environment (MMS, 2002, 2004).

Florida Manatee (endangered species). The Florida manatee occasionally occurs in coastal waters of Louisiana, Mississippi, Alabama, and the Florida Panhandle during summer months. OSRA modeling indicates no contacts with shorelines within 3 days and a very small probability of contacting any shoreline within 10 days after a spill at the project area. During this time, natural weathering processes and spill response measures as described in the Sub-Regional OSRP are assumed to remove most or all of the spilled oil, preventing significant impacts to manatees or their habitat. In addition, the number of manatees potentially present along this coast is a small fraction of the population in peninsular Florida, and the population is not likely to be adversely affected by offshore oil and gas activities, including an oil spill (USFWS, 2001).

Other Marine Mammals. The most common nonendangered cetaceans in the deepwater environment are pantropical spotted dolphin, spinner dolphin, and clymene dolphin. Other species that may be present include dwarf and pygmy sperm whales, four species of beaked whales, and 14 species of dolphins and porpoises. The total area affected by a spill is expected to be small relative to the available deepwater habitat. Although a spill could contact marine mammals, primarily sublethal effects are expected due to avoidance and natural dispersion/weathering of the spill in the offshore environment (MMS, 2002).

B.1.8 Sea Turtles

Five species of endangered or threatened sea turtles may be found near the project area. Endangered species are the leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) sea turtles. The loggerhead sea turtle (*Caretta caretta*) is a threatened species. The green sea turtle (*Chelonia mydas*) is listed as threatened, except for the Florida breeding population, which is listed as endangered.

Leatherbacks and loggerheads are the most likely turtles to be present as adults near the project area. Leatherbacks are the most pelagic of the sea turtles and were frequently sighted on the continental slope during GulfCet II aerial surveys (Mullin and Hoggard, 2000). Leatherbacks were sighted on the continental slope in the northeastern Gulf during summer months, but not during winter. Although loggerheads were more abundant in shallower water, they were also sighted in deepwater areas during winter (Mullin and Hoggard, 2000). Green, hawksbill, and Kemp's ridley turtles are typically inshore species that are unlikely to occur near the project area as adults. Hatchlings or juveniles of any of the sea turtles may be present in deepwater areas, where they may be associated with sargassum and other flotsam.

Sea turtle nesting in the northeastern Gulf of Mexico can be summarized as follows:

- Loggerhead turtles nest in significant numbers along the Florida Panhandle and to a lesser extent in Alabama, Mississippi, and Louisiana. Loggerheads account for over 99 percent of turtle nests on northwest Florida beaches, with their nesting season extending from 1 May through 31 October (MMS, 2002).
- Green turtles infrequently nest on Florida Panhandle and Alabama beaches, generally between 1 May and 30 September (Meylan et al., 1995; Alabama Game and Fish Division, 1997).
- Leatherback turtles occasionally nest on Florida Panhandle beaches from 1 May through 31 October (MMS, 2002).
- Hawksbill and Kemp's ridley turtles do not nest anywhere near the project area.

(a) Routine Operations

Routine IPFs potentially affecting sea turtles include

- Presence of structures (noise and lights);
- Marine trash and debris; and
- Support operations (service vessels and helicopters).

Other factors such as effluent discharges are likely to have negligible impacts on sea turtles due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

Presence of Structures (noise and lights). Offshore drilling activities produce a broad array of sounds at frequencies and intensities that may be detected by sea turtles (Geraci and St. Aubin, 1987). Potential impacts may include behavioral disruption and temporary or permanent displacement from the area near the sound source. Certain sea turtles, especially loggerheads, may be attracted to offshore structures and thus may be more susceptible to impacts from sounds produced during routine operations.

Helicopters and service vessels may also affect sea turtles due to machinery noise and/or visual disturbances. The most likely impacts would be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area.

Turtle hatchlings may be attracted to brightly lit offshore platforms, where they may be subject to increased predation by birds and fishes that are also attracted to offshore structures. However, NMFS (2002) indicates that attraction to offshore platforms is unlikely to appreciably reduce the reproduction, numbers, or distribution of sea turtles in the wild.

Marine Trash and Debris. Ingestion of, or entanglement with, accidentally discarded solid debris can kill or injure sea turtles (Lutcavage et al., 1997). Some adult sea turtles such as loggerheads and leatherbacks may ingest plastic debris. The disposal of solid waste from drilling rigs and vessels is prohibited. Also, MMS has issued NTL 2003-G11, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires posting of placards at prominent locations on offshore vessels and structures, and requires a marine trash and debris awareness training and certification process. Compliance with this NTL and any related MMS requirements is assumed to be effective in minimizing the potential for debris-related impacts on sea turtles.

Support Operations (service vessels and helicopters). There is a chance of collision between service vessels and sea turtles. While adult turtles are visible at the surface during the day and in clear weather, they can be difficult to spot from a moving vessel when resting below the water surface or during nighttime or periods of inclement weather. To reduce the potential for vessel strikes, the MMS has issued NTL 2003-G10, which recommends protected species identification training, specifies ways for vessel operators and crews to avoid vessel strikes, and requires operators to report sightings of any injured or dead protected species. Compliance with this NTL and any related MMS requirements is assumed to be effective in minimizing the likelihood of striking sea turtles.

(b) Accidents

Any of the five species of sea turtles could be affected by a spill in offshore waters. However, the turtles most likely to be affected would be leatherbacks and loggerheads, the most common adult turtles in offshore waters. Leatherbacks and loggerheads are regularly sighted within deepwater areas over the continental slope. In addition, juvenile turtles are regularly found within convergence zones in deepwater areas. The total area of a slick is expected to be small relative to the available deepwater habitat. Although turtle numbers within the deepwater Gulf are small when compared to the continental shelf, it is possible that individuals may come into contact with a spill. It is possible that some individuals may not recover from such exposure. However, primarily sublethal effects are expected (MMS, 2002, 2004).

The OSRA modeling indicates no contacts with any shorelines within 3 days, no contacts with Florida Panhandle turtle nesting beaches within 10 days, and a very small probability of contacting any shoreline within 10 days. During this time, it is assumed that most or all of the spill volume would be removed due to weathering and response measures. Therefore, no significant impacts on turtle nesting beaches would be expected.

B.1.9 Air Quality

There are no site-specific air quality data for the project area. The attainment status of Federal OCS waters is unclassified because there is no provision for classification in the Clean Air Act for waters outside of State waters (MMS, 2002). Due to the distance from shore-based pollution sources, offshore air quality is expected to be good.

All coastal counties and parishes in Louisiana, Mississippi, Alabama, and Florida are considered to be in attainment of the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and suspended particulate matter (PM_{10}). Five Louisiana parishes (Ascension, Iberville, East Baton Rouge, West Baton Rouge, and Livingston) are nonattainment areas for ozone (O_3).

The Breton National Wilderness Area, which is part of the Breton National Wildlife Refuge (NWR) is designated under the Clean Air Act as a Prevention of Significant Deterioration Class I air quality area. This area is protected by stringent air quality standards administered by the USFWS. Mitigating measures, including low sulfur diesel fuels and stricter air emissions monitoring and reporting requirements, are required for sources that are within 100 km of the Breton Class I area and that exceed emissions levels agreed upon by the administering agencies. The project area is beyond the 100-km radius from Breton Island, and therefore no special requirements apply.

(a) Routine Operations

Routine IPFs potentially affecting air quality include

- Air emissions (from pipeline and Hub installation, as well as Hub operations); and
- Support operations (service vessels and helicopters).

Routine offshore air pollutant emissions will result from both the Hub production operations, and helicopters and service vessels. These emissions occur mainly from combustion or burning of fuels and natural gas and from venting or evaporation of hydrocarbons. The combustion of fuels occurs primarily on diesel-powered generators, pumps, or motors and from lighter fuel motors. Primary air pollutants associated with OCS activities are nitrogen oxides, CO, sulfur oxides, volatile organic compounds (VOCs), and PM_{10}.

Due to the distance from shore, routine operations in the project area will have no impact on air quality conditions along the coast, including the Florida Panhandle. ***DOCD Appendix G*** provides the Projected Air Quality Emissions Report prepared in accordance with NTL 2003-G17. Annual exemption levels are set by the MMS based on the distance from shore. As shown in **Table 3**, the projected annual emissions are below the exemption levels, and therefore no further analysis is required.

(b) Accidents

A large spill would affect air quality in the vicinity of the oil slick by introducing VOCs through evaporation. The emissions would not last long due to rapid volatilization of hydrocarbons. Evaporation is greatest within the first few days (MMS, 2002). The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time.

Table 3. Summary of air emissions calculations.

Year	Emitted Substance (tons)					Includes
	Particulate Matter	Sulfur Oxides	Nitrogen Oxides	Volatile Organic Compounds	Carbon Monoxide	
2006	43.10	197.73	1,481.60	44.45	323.26	Completion
2007	6.37	28.48	744.32	10.75	388.01	Flowline installation Production*
2008	1.85	9.31	1,120.67	10.13	692.07	Production*
2009	1.85	9.31	1,120.67	10.13	692.07	Production*
2010	1.85	9.31	1,120.67	10.13	692.07	Production*
2011	1.85	9.31	1,120.67	10.13	692.07	Production*
2012	1.85	9.31	1,120.67	10.13	692.07	Production*
2013	1.85	9.31	1,120.67	10.13	692.07	Production*
2014	1.85	9.31	1,120.67	10.13	692.07	Production*
2015	1.85	9.31	1,120.67	10.13	692.07	Production*
2016	1.85	9.31	1,120.67	10.13	692.07	Production*
2017	1.85	9.31	1,120.67	10.13	692.07	Production*
2018	1.85	9.31	1,120.67	10.13	692.07	Production*
2019	1.85	9.31	1,120.67	10.13	692.07	Production*
2020	1.85	9.31	1,120.67	10.13	692.07	Production*
2021	1.85	9.31	1,120.67	10.13	692.07	Production*
2022	1.85	9.31	1,120.67	10.13	692.07	Production*
2023	1.85	9.31	1,120.67	10.13	692.07	Production*
2024	1.85	9.31	1,120.67	10.13	692.07	Production*
2025	1.85	9.31	1,120.67	10.13	692.07	Production*
2026	1.85	9.31	1,120.67	10.13	692.07	Production*
2027	1.85	9.31	1,120.67	10.13	692.07	Production*
Allowable	3,996.00	3,996.00	3,996.00	3,996.00	82,717.95	

* "Production" refers to air emissions at the Independence Hub during production. These are provided for information only and are based on maximum emissions at the Hub, not just those resulting from production in AT 261.

The OSRA modeling indicates no contacts with shorelines within 3 days after a spill, when most of the evaporation occurs. Therefore, little or no impact on air quality in coastal or onshore areas would be expected.

A small chemical spill could also produce short-term, localized impacts on air quality (for example, if chemical dust or VOCs were released). The consequence of a spill of any of the chemicals in the chemical inventory would be dependent on the type and volume of chemicals released. A short-term, localized reduction in air quality might be expected following a spill of volatile materials.

B.1.10 Shipwreck Sites (known or potential)

(a) Routine Operations

There are no IPFs associated with routine operations that are likely to cause impacts to shipwreck sites. The lease is not on the MMS list of blocks determined to have a high probability of archaeological resources. Therefore, no impacts are expected.

(b) Accidents

The OSRA modeling indicates no contacts with coastal waters or shorelines within 3 days and a very small probability of contacting any shoreline within 10 days after a spill. Based on spill weathering characteristics and planned response measures, it is considered highly unlikely that a large oil spill in the project area would reach coastal areas or very shallow waters where shipwreck sites might become contaminated with oil.

B.1.11 Prehistoric Archaeological Sites

(a) Routine Operations

There are no IPFs that are likely to cause impacts to prehistoric archaeological sites. The lease is not on the MMS list of blocks determined to have a high probability of archaeological resources. Therefore, no impacts are expected.

(b) Accidents

The OSRA modeling indicates no contacts with coastal waters or shorelines within 3 days and a very small probability of contacting any shoreline within 10 days after a spill. Based on the anticipated spill weathering characteristics and planned response measures, it is considered highly unlikely that a spill in the project area would reach coastal areas or very shallow waters where prehistoric sites could become contaminated with oil.

B.2 VICINITY OF OFFSHORE LOCATION

B.2.1 Essential Fish Habitat

Most fishery species in the Gulf of Mexico are managed by the Gulf of Mexico Fishery Management Council (GMFMC). This council has prepared fishery management plans (FMPs) identifying EFH for corals and coral reefs, shrimp, stone crab, spiny lobster, reef fishes, coastal pelagic fishes, and red drum, none of which occur within the deeper waters overlying the lease area.

Another group of exploited species, the highly migratory pelagic fishes, are managed by NMFS. In its FMP for Atlantic tunas, swordfish, and sharks that inhabit the Gulf of Mexico, NMFS (1999) addressed EFH for managed highly migratory species. These include 10 sharks, 3 tunas, and 1 swordfish species of concern. These migratory species may occur as transients in the project area. EFH includes most of the substrate and water column of the Gulf of Mexico where the managed species commonly occur. Although billfishes (sailfish [*Istiophorus platypterus*], blue marlin [*Makaira nigricans*], white marlin [*Tetrapterus albidus*], and longbill spearfish [*T. pfluegeri*]) are now managed as highly migratory species, there were no EFH designations in NMFS (1999).

Spatially limited EFH called habitat areas of particular concern (HAPCs) have also been identified in the Gulf of Mexico by the GMFMC. These include Dry Tortugas (Fort Jefferson National Monument), Florida Keys National Marine Sanctuary, Florida Middle Grounds, and Flower Garden Banks National Marine Sanctuary. While no HAPCs are located near the lease area, migratory species that use these HAPCs may migrate through the Atwater Valley area.

While the project area *per se* is not recognized as an important or critical area for breeding or migrations, the presence of the Loop Current (normally located to the south of the project area) and its role as a migratory pathway for highly migratory pelagic fish species suggest that migrants may be rare but present intermittently. Deepwater habitats, including those of the project area, may provide spawning areas for pelagic fishes such as king and Spanish mackerels and others.

(a) Routine Operations

Routine IPFs potentially affecting EFH include

- Presence of structures; and
- Effluent discharges.

Presence of Structures. The drillship and Independence Hub will act as a fish attracting device (FAD). In oceanic waters, the FAD effect would be most pronounced for epipelagic fishes such as tunas, dolphin, billfishes, and jacks, which are commonly attracted to fixed and drifting surface structures (e.g., Holland et al., 1990; Higashi, 1994; Relini et al., 1994). This FAD effect would possibly enhance feeding of epipelagic predators by attracting and concentrating smaller fish species.

Effluent Discharges. Other effluent discharges affecting EFH via diminution in ambient water quality include sanitary and domestic wastes, deck drainage, uncontaminated freshwater or seawater, desalination brine, uncontaminated ballast and bilge water, and miscellaneous discharges. Impacts on water quality have been discussed previously. No significant impacts on EFH are expected from these discharges.

(b) Accidents

A major spill in offshore waters would produce a slick on the water and temporarily increase hydrocarbon concentrations. Given that EFH includes most of the substrate and water column of the Gulf of Mexico where highly migratory managed species commonly occur, some impact on EFH would be unavoidable. However, the area affected would be a very small percentage of the EFH in the Gulf of Mexico, and the duration would be brief (few hours to a few days).

A large spill could affect water column biota including phytoplankton, zooplankton, and nekton. While adult and juvenile fishes may actively avoid a large oil spill, the planktonic eggs and larvae would be unable to avoid contact. Eggs and larvae of fishes will die if exposed to certain toxic fractions of spilled oil. Most of the fishes inhabiting shelf or oceanic waters of the Gulf of Mexico have planktonic eggs and larvae. Impacts would be potentially greater if local scale currents retained planktonic larval assemblages (and the floating oil slick) within the same water mass. However, due to the wide dispersal of early life history stages of fishes in the surface waters of the Gulf of Mexico, a spill is not expected to have significant impacts at the population level.

A blowout resulting in a condensate spill could affect benthic communities within a few hundred meters of the wellsite. The impacts are discussed under Benthic Communities. The spill could affect a relatively small area of soft bottom seafloor, which would be recolonized by benthic organisms over a period of months to years. Neither chemosynthetic nor live bottom communities are found in the lease block. Therefore, a major spill is unlikely to have any impacts on EFH for demersal fishes.

The project area is not recognized as an important or critical area for breeding or migrations. However, the Loop Current, which is generally located south of the project area but sometimes overlaps it, serves as a migratory pathway for bluefin tuna and other migratory pelagic fishes as they move between the Gulf of Mexico and adjacent waters. Migratory species that migrate through the Atwater Valley area following a spill could be exposed briefly to the spill. In open ocean waters, especially those near the Loop Current, it is expected that a spill would be naturally dispersed and weathered rapidly. Due to the limited area affected by a deepwater spill and the rapid dissolution and evaporation of the slick, no significant impacts on breeding habitats or migration routes would be expected.

B.2.2 Marine and Pelagic Birds

A variety of seabirds may occur in the pelagic environment of the project area (Clapp et al., 1982a,b, 1983; Peake, 1996; Hess and Ribic, 2000). Seabirds spend much of their lives offshore over the open ocean, except during breeding season when they nest along the coast. In addition, other birds such as waterfowl, marsh birds, and shorebirds may occasionally be present over open ocean areas. No endangered or threatened bird species are likely to occur at the project area due to the distance from shore. For a discussion of Shore Birds and Coastal Nesting Birds, see **EIA Section B.3.3**.

Seabirds of the northeastern Gulf of Mexico were surveyed from ships during the GulfCet II program. Hess and Ribic (2000) reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in the deepwater area (>200 m). Relationships with hydrographic features were found for several species, possibly due to effects of hydrography on nutrient levels and productivity of surface waters where birds forage. GulfCet II did not estimate bird densities; however, Powers (1987) indicates that seabird densities over the open ocean typically are <10 birds/km^2.

(a) Routine Operations

Routine IPFs potentially affecting marine and pelagic birds include

- Presence of structures; and
- Marine trash and debris.

Other factors such as effluent discharges are likely to have negligible impacts on marine birds due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

Presence of Structures. Pelagic seabirds and trans-Gulf migrant birds may be present at the project area. Birds may use offshore drilling rigs and platforms for resting, feeding, or as temporary shelter from inclement weather (Russell, 2005). Some birds may be attracted to offshore structures because of the lights and the fish populations that aggregate around these structures. Birds that frequent platforms may be exposed to contaminants including air pollutants and routine discharges, but significant impacts are unlikely due to rapid dispersion. Birds migrating over water at night have been known to strike offshore structures, resulting in death or injury (Wiese et al., 2001; Russell, 2005).

Marine Trash and Debris. Debris lost overboard from offshore operations can injure or kill birds that ingest or become entangled in it. MMS regulations and Federal law prohibit disposal of trash and debris in the ocean. In addition, MMS has issued NTL 2003-G11, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires posting of placards at prominent locations on offshore vessels and structures, and requires a marine trash and debris awareness training and certification process. Compliance with this NTL and any related MMS requirements is assumed to be effective in minimizing the potential for debris-related impacts on birds.

(b) Accidents

Pelagic seabirds could be exposed to oil from a spill at the project area. Hess and Ribic (2000) reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in the deepwater Gulf of Mexico (>200 m). Powers (1987) indicates that seabird densities over the open ocean typically are <10 birds/km^2, and therefore total numbers of birds potentially affected by a spill would be small.

Spilled oil may affect birds through various pathways. Direct contact with oil may result in the fouling or matting of feathers with subsequent limitation or loss of flight capability, or insulating or water repellent capabilities; irritation or inflammation of skin or sensitive tissues such as eyes and other mucous membranes; or toxic effects from ingested oil or the inhalation of oil or related volatile distillates. The Central Gulf multisale EIS discusses these impacts (MMS, 2002).

B.2.3 Public Health and Safety

(a) Routine Operations

There are no IPFs associated with routine operations that are expected to affect public health and safety.

(b) Accidents

An H_2S release was not considered as an IPF because MMS determined AT 261 to be "H_2S absent" by letter dated 9 September 2002. No impacts on public health and safety are expected from an H_2S release.

In the event of a major spill from a tank rupture or blowout, the main safety and health concerns are those of the offshore personnel responding to such a spill. The proposed activities will be covered by the Sub-Regional OSRP, and in addition, the Independence Hub will maintain a Shipboard Oil Pollution Emergency Plan as required under MARPOL 73/78. Anadarko will use the best and safest technologies throughout the project, including spill response efforts. Based on the WCD discharge volumes, anticipated weathering characteristics, and response measures as detailed in the Sub-Regional OSRP, it is expected that most or all of the spill would be removed before reaching coastal waters or shorelines. Therefore, no impacts on the health and safety of the general public are expected.

B.3 COASTAL AND ONSHORE

Coastal habitats in the northeastern Gulf of Mexico that may be affected by oil and gas activities are described in the Central Gulf multisale EIS (MMS, 2002) and in a literature review by Collard and Way (1997). Sensitive coastal habitats are also tabulated in Anadarko's Sub-Regional OSRP. Coastal habitats inshore of the project area include barrier beaches and dunes, wetlands, and submerged seagrass beds. Generally, most of the northeastern Gulf is fringed by barrier beaches, with wetlands and/or submerged seagrass beds occurring in sheltered areas behind the barrier islands and in estuaries.

B.3.1 Beaches

(a) Routine Operations

There are no IPFs associated with routine activities that could affect beaches due to the distance from shore (over 100 miles).

(b) Accidents

The OSRA modeling indicates no contacts with any shorelines within 3 days after a spill (see **Table 2**). In addition, there is a very small probability of contacting any shoreline within 10 days. During this time, most or all of the spill volume is assumed to be removed due to spill weathering and response measures. Therefore, no significant impacts on beaches are expected.

B.3.2 Wetlands

(a) Routine Operations

Coastal wetlands are unlikely to be affected by a routine IPF due to the distance from shore (over 100 miles). Support operations including crew boats and supply boats may have a minor incremental impact on coastal wetlands. Over time with a large number of vessel trips, vessel wakes can erode shorelines along inlets, channels, and harbors. This is particularly of concern in coastal Louisiana because of the existing high rate of coastal wetland loss. Impacts are assumed to be minimized by following the speed and wake restrictions in harbors and channels.

(b) Accidents

The OSRA modeling indicates no contacts with shorelines within 3 days after a spill and a very small probability of contacting any shoreline within 10 days. During this time, most or all of the spill volume is assumed to be removed due to spill weathering and response measures. Therefore, no significant impacts on wetlands are expected.

B.3.3 Shore Birds and Coastal Nesting Birds

The following bird species of concern are found in inshore waters or onshore areas:

- Brown pelican;
- Piping plover;
- Southeastern snowy plover; and
- Bald eagle.

Two other endangered species are mentioned in the Central Gulf multisale EIS (MMS, 2002) but do not warrant further discussion: (1) the least tern, for which the endangered designation applies only to interior populations; and (2) the whooping crane, which is not likely to be present inshore of the project area (they winter at Aransas National Wildlife Refuge, Texas).

Brown Pelican. The eastern brown pelican (*Pelecanus occidentalis*) inhabits coastal habitats and forages within coastal waters and waters of the inner continental shelf. Aerial and shipboard surveys including GulfCet and GulfCet II indicate that brown pelicans do not occur in deep, offshore waters (Fritts and Reynolds, 1981; Peake, 1996; Hess and Ribic, 2000). Subsequent to the ban of DDT pesticide, this species has successfully recolonized much of its former range. It has been de-listed from its endangered status in Alabama and Florida, though still listed as endangered in Louisiana and Mississippi (USFWS, 2002). Brown pelicans are listed by Florida as a species of special concern.

Piping Plover. The piping plover (*Charadrius melodus*) is a migratory shorebird that overwinters along the southeastern U.S. and Gulf of Mexico coasts. Piping plovers inhabit coastal sandy beaches and mudflats. This species is currently in decline and listed as threatened as a result of historic hunting pressure, and habitat loss and degradation (Ehrlich et al., 1992). Critical habitat has been proposed, including coastal areas in Florida, Alabama, Mississippi, and Louisiana.

Southeastern Snowy Plover. The southeastern snowy plover (*Charadrius alexandrinus tenuirostris*) is a shorebird that nests within Gulf of Mexico coastal habitats such as dry sandy beaches and flats. Though not Federally listed as endangered or threatened (USFWS, 2002), it is listed as threatened by the State of Florida due to population declines resulting from habitat loss and degradation (Ehrlich et al., 1992). Nesting sites in the Florida Panhandle range from the Alabama border eastward beyond Little St. George.

Bald Eagle. The southern bald eagle (*Haliaeetus leucocephalus*) is a terrestrial raptor that is widely distributed across the southern U.S., including coastal habitats along the Gulf of Mexico. The Gulf coast is inhabited by both wintering migrant and resident bald eagles (Johnsgard, 1990; Ehrlich et al., 1992). Populations of southern bald eagles have increased in recent years as a result of the ban of DDT pesticide and the efforts of intense recovery programs. Populations in the lower 48 states are classified as threatened, but the USFWS has proposed to de-list the species in the lower 48 states (USFWS, 2002).

(a) Routine Operations

Due to the distance from shore, the only routine IPF that may affect shore birds and coastal nesting birds is support operations. Support vessels and helicopters will transit coastal areas in Louisiana where species such as the brown pelican, piping plover, snowy plover, and bald eagle may be found. Helicopter and vessel traffic could periodically disturb individuals or groups of birds within sensitive coastal habitats (e.g., wetlands that may support feeding, resting, or breeding birds). However, Federal Aviation Administration guidelines and corporate helicopter policies specify that pilots maintain a minimum altitude of 213 m (700 ft) while in transit offshore, 305 m (1,000 ft) over unpopulated areas or across coastlines, and 610 m (2,000 ft) over populated areas and sensitive habitats such as wildlife refuges and park properties. Vessel operators use

designated navigation channels and comply with posted speed and wake restrictions while transiting sensitive inland waterways. With these guidelines in effect, it is likely that individual birds would experience at most only short-term, behavioral disruption.

(b) Accidents

Coastal bird species of concern that could be affected include the brown pelican, piping plover, southeastern snowy plover, and bald eagle. Brown pelicans typically do not venture offshore of the inner continental shelf. Piping plovers and southeastern snowy plovers could encounter the spill only if it reached coastal habitats. A spill would not be expected to contact or otherwise impact bald eagles unless contamination and subsequent cleanup activities occurred within the vicinity of eagle nesting or roosting sites. The OSRA modeling indicates no contacts with any shorelines within 3 days after a spill and a very small probability of contacting any shoreline within 10 days. During this time, it is assumed that most or all of the spill volume would be removed due to spill weathering and response measures. Therefore, no significant impacts on shore birds or coastal nesting birds, including species of concern, are expected.

B.3.4 Coastal Wildlife Refuges

National wildlife refuges along the coast from Cedar Key, Florida through Louisiana include four in Florida (Cedar Keys, Lower Suwannee, St. Marks, and St. Vincent), two in Alabama (Grand Bay and Bon Secour), one in Mississippi (Grand Bay), and three in Louisiana (Breton, Delta, and Shell Keys). In addition, there are various State wildlife refuges in coastal areas (tabulated in Anadarko's Sub-Regional OSRP).

(a) Routine Operations

Due to the distance from shore, there are no IPFs associated with routine activities that are likely to affect coastal wildlife refuges.

(b) Accidents

Coastal wildlife refuges could be affected only if a major spill occurred and the oil was transported to shore in significant quantities before being weathered by natural processes or dispersed by response measures. The OSRA modeling indicates that no coastal areas would be contacted by oil within 3 days, and there is a very small probability of oil contacting any shoreline within 10 days. During this time, most or all of the spill would be removed due to natural weathering processes and spill response measures as described in the Sub-Regional OSRP. Therefore, no significant impacts on coastal wildlife refuges or other protected areas are expected.

B.3.5 Wilderness Areas

Wilderness areas and other protected coastal areas in Louisiana, Mississippi, Alabama, and the Florida Panhandle include a national seashore, numerous Wildlife Management Areas and State Parks, aquatic preserves, and other managed areas. There is also an Audubon Bird Sanctuary on the eastern end of Dauphin Island, Alabama. These areas include habitats such as barrier beach and dune systems, wetlands, and submerged seagrass beds that support wildlife including endangered or threatened species.

(a) Routine Operations

Due to the distance from shore, there are no IPFs associated with routine activities that are likely to affect wilderness areas.

(b) Accidents

Wilderness areas and other protected areas in Louisiana, Mississippi, Alabama, and the Florida Panhandle could be affected only if a major spill occurred and the oil was transported to shore in significant quantities before being weathered by natural processes or dispersed by response measures. The OSRA modeling indicates no shoreline contacts within 3 days and a very small probability of contacting any shoreline within 10 days. During this time, most or all of the spill would be removed due to spill weathering and response measures as described in the OSRP. Therefore, no significant impacts on coastal wilderness areas are expected.

B.4 OTHER RESOURCES

B.4.1 Benthic Communities

The seafloor within the lease block is expected to consist of soft sediments. Water depth ranges from 2,527 to 2,545 m (8,290 to 8,350 ft). These depths would place the project area within the Mesoabyssal Zone for both megafauna and macroinfauna, as defined by Gallaway (1988). In terms of megafauna, the fish assemblage is characterized as depauperate, consisting of five species including *Dicrolene kanazawai* and *Basozetus normalis* (Pequegnat et al., 1990). Macroinfaunal densities reported by Gallaway (1988) for these depths are about 500 to 1,000 individuals/m^2. There are no individual dominant species in the deep-sea macroinfauna, but polychaetes are the most abundant and diverse group.

Meiofauna (animals passing through a 0.5-mm sieve but retained on a 0.062-mm sieve) and microbiota are also important components of the deep-sea benthos. Rowe (2000) indicates little information is available on either group for the deep Gulf. Meiofaunal densities and biomass in the depths of the project area are higher than those of the macroinfauna (Gallaway, 1988). Available data suggest that bacteria are the most important biotic component in terms of biomass, and much of the organic carbon supplying the benthos with energy cycles through the bacteria (Cruz-Kaegi, 1998).

A deep Gulf of Mexico benthos program has expanded on the depth and geographic coverage of the previous continental slope study (Rowe and Kennicutt, 2002). The study includes stations at depths from 300 m to over 3,000 m. Preliminary data from nearby Stations S37, S38, S39, and S40 indicate macrofaunal densities of about 4,000 to 10,000 individuals/m^2. Elevated macrofaunal densities were noted at some stations near Desoto Canyon, which may be attributable to organic matter accumulation. These densities are considerably higher than those reported previously by Gallaway (1988).

(a) Routine Operations

The most important IPFs on deepwater benthic communities are physical disturbances of the seafloor. In ***EIA Section A.1***, the total area disturbed was estimated to be about 4 ha for installation of subsea facilities in AT 261 and about 10.2 ha for installation of right-of-way pipelines connecting to the Independence Hub. A few hectares are assumed to be disturbed in MC 920 by the 12 suction pilings used to moor the Independence Hub.

These physical disturbances may result in crushing of benthic fauna, burial or disruption of fauna, and increased turbidity from sediment resuspension. Disturbed bottom sediments will be recolonized through larval settlement and migration from adjacent areas. Because some deep-sea biota grow and reproduce slowly, recovery may require several years.

Pursuant to NTL No. 2003-G03, operators may be required to conduct remotely operated vehicle (ROV) surveys during pre-spudding and post-drilling operations for the purpose of biological and physical observations. If required by the MMS, Anadarko will conduct an ROV survey as specified under this NTL. ROV surveys provide information about the extent of impacts on deepwater benthic communities.

(b) Accidents

A blowout resulting in a condensate spill could affect benthic communities within a few hundred meters of the wellsite. While some oil could initially adhere to surface sediments surrounding the wellsite, resulting in smothering and/or toxicity to benthic organisms, most of the oil is assumed to rise rapidly through the water column. The physical impacts of a subsurface blowout are also a consideration. The MMS (2002) estimates that a severe subsurface blowout could resuspend and disperse sediments within a 300-m radius. While coarse sediments (sands) would probably settle at a rapid rate within 400 m from the blowout site, fine sediments (silts and clays) could be resuspended for more than 30 days and dispersed over a much wider area. Surface sediments at the project area are assumed to be largely silt and clay, based on previous studies (Gallaway, 1988). The affected area would be recolonized by benthic organisms over a period of months to years.

Neither chemosynthetic nor live bottom communities are found in the lease block. It is possible that undiscovered chemosynthetic communities exist in other deepwater lease blocks, and live bottom areas are known to be present on the Mississippi-Alabama shelf and shelf edge. However, a spill at the sea surface is unlikely to reach the seafloor. Therefore, a major spill is unlikely to have any impacts on sensitive benthic habitats.

A chemical spill at the surface would be unlikely to affect benthic communities unless heavy or solid materials (e.g., pieces of copper or lead) were lost overboard and sank rapidly to the bottom. Material accumulating on the seabed could kill or injure a few benthic organisms, or alter the sediment quality in a small area that would most likely already be disturbed by previous cuttings and drilling fluid releases. Impacts on benthic communities would be minor to negligible.

B.4.2 Pelagic Communities

(a) Routine Operations

Routine IPFs potentially affecting pelagic communities include

- Presence of structures; and
- Effluent discharges.

Presence of Structures. The Independence Hub will act as an FAD. In oceanic waters, the FAD effect would be most pronounced for epipelagic fishes such as tunas, dolphin, billfishes, and jacks, which are commonly attracted to fixed and drifting surface structures (e.g., Holland et al., 1990; Higashi, 1994; Relini et al., 1994). This FAD effect

would possibly enhance feeding of epipelagic predators by attracting and concentrating smaller fish species.

Effluent Discharges. Produced water discharges have some characteristics that could adversely affect pelagic biota, including low dissolved oxygen and high levels of suspended solids, salinity, organic carbon, and certain metals and organic compounds (Neff, 1987). However, these discharges are expected to disperse and dilute to background levels within about 1,000 m of the discharge point, with no significant biological impacts (MMS, 2002).

Sanitary and domestic wastes may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. Sanitary and domestic wastes may have elevated levels of nutrients, organic matter, and chlorine, but should be diluted rapidly to undetectable levels within tens to hundreds of meters of the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Deck drainage may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. Deck drainage from contaminated areas will be passed through an oil-water separator prior to release, and discharges will be monitored for visible sheen. The discharges may have slightly elevated levels of hydrocarbons but should be diluted rapidly to undetectable levels within tens to hundreds of meters of the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Other discharges in accordance with the NPDES permit, such as uncontaminated freshwater or seawater, desalination brine, uncontaminated ballast and bilge water, and miscellaneous discharges are expected to be diluted rapidly and have little or no impact on water column biota.

(b) Accidents

A large spill could affect water column biota including phytoplankton, zooplankton, and nekton. While adult and juvenile fishes may actively avoid a large oil spill, the planktonic eggs and larvae would be unable to avoid contact. Eggs and larvae of fishes will die if exposed to certain toxic fractions of spilled oil. Most of the fishes inhabiting shelf or oceanic waters of the Gulf of Mexico have planktonic eggs and larvae (Richards et al., 1989, 1993). Impacts would be potentially greater if local scale currents retained planktonic larval assemblages (and the floating oil slick) within the same water mass. However, due to the wide dispersal of early life history stages of fishes in the surface waters of the Gulf of Mexico, a spill is not expected to have significant impacts at the population level.

The inventory of chemicals on board for the exploratory drilling program is predominantly formulations with low environmental hazards to the marine environment, and quantities transported are relatively small, hence a chemical spill will have lower environmental implications compared to a large oil spill. Any chemical spill reaching the sea surface has the potential to interact with marine organisms in the immediate vicinity of the spill. Phytoplankton, zooplankton, and nekton may potentially encounter spilled chemicals; however, rapid dilution, dissolution, or dispersal via wind and wave action will temper such impacts. Impacts on pelagic communities would be negligible.

B.4.3 Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is the only listed threatened fish species in the Gulf of Mexico. An anadromous fish that migrates from the sea upstream into coastal rivers to spawn in freshwater, it historically ranged from the Mississippi River to Charlotte Harbor, Florida (Wakeford, 2001). Today, this range has contracted to encompass major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida. Populations have been depleted or even extirpated throughout this range by fishing, shoreline development, dam construction, water quality changes, and other factors (Barkuloo, 1988; Wakeford, 2001). These declines prompted the listing of the Gulf sturgeon as a threatened species in 1991. The best known populations occur in the Apalachicola and Suwannee Rivers in Florida (Carr, 1996; Sulak and Clugston, 1998), the Choctawhatchee in Alabama (Fox et al., 2000), and the Pearl in Mississippi/Louisiana (Morrow et al., 1998).

Adult Gulf sturgeon spend March through October in the rivers and November through February in estuarine or shelf waters. The offshore distribution of Gulf sturgeon during winter months is not known, but there have been no reported catches in Federal OCS waters (MMS, 2002).

In 2003, critical habitat for the Gulf sturgeon was designated in Louisiana, Mississippi, Alabama, and Florida. Critical habitat identifies specific areas that are essential to the conservation of Gulf sturgeon and that may require special management considerations or protections. Fourteen geographic areas among the Gulf of Mexico rivers and tributaries were designated critical habitat. The areas extend from Lake Borgne in Louisiana to Suwannee Sound in Florida (MMS, 2004).

(a) Routine Operations

There are no IPFs associated with routine project activities that are likely to affect Gulf sturgeon.

(b) Accidents

Presumably, Gulf sturgeon could be affected if oil reached very shallow waters or coastal rivers. However, the OSRA modeling indicates no contacts with coastal waters within 3 days after a spill and a very small probability of any shoreline contact within 10 days. During this time, it is assumed that most or all of the spill volume would be removed due to spill weathering and response measures. Therefore, no significant impacts on Gulf sturgeon are expected.

B.4.4 Endangered Beach Mice

Four subspecies of endangered beach mouse occur on barrier islands of Alabama and the Florida Panhandle (MMS, 2002).

(a) Routine Operations

There are no IPFs associated with routine project activities that could affect endangered beach mice due to the distance from shore and the lack of any onshore support activities near any area inhabited by these species.

(b) Accidents

The OSRA modeling indicates no contacts with shorelines inhabited by beach mice within 10 days after a spill. By this time, it is assumed that all of the spill volume would be removed due to spill weathering and response measures. Therefore, no significant impacts on beach mice are expected.

B.4.5 Economic and Demographic Conditions

(a) Routine Operations

The project involves offshore operations with support from existing shore base facilities in Louisiana. Due to the low level of activity and the small number of personnel involved, the project will have a negligible impact on economic and demographic conditions including local employment, and local population centers and industry. No new employees are expected to move permanently into the area.

(b) Accidents

Response to a spill would involve existing resources and personnel, and therefore it would not be expected to have any impact on employment, local population centers, or industry. The OSRA modeling indicates no contacts with shorelines within 3 days after a spill and a very small probability of contacting any shorelines within 10 days after a spill. During this time, all of the spill volume would be removed due to spill weathering and response measures. Therefore, no direct or indirect impacts on economic conditions due to oiling of waters or shorelines, cleanup activities, etc. would be expected.

B.4.6 Land Use

(a) Routine Operations

The project will use existing onshore support facilities in coastal Louisiana. The existing land use is industrial. The project will not involve any new construction or changes to existing land use, and therefore will not have any impacts. Levels of boat and helicopter traffic, as well as demand for goods and services including scarce coastal resources, will represent a very small fraction of the overall level of activity occurring at the shore base.

(b) Accidents

An offshore spill would not be expected to affect land use.

B.4.7 Recreation and Tourism

(a) Routine Operations

There are no known recreational uses of the lease block. Recreational resources and tourism in coastal areas would not be affected by any routine activities due to the distance from shore (over 100 miles). Anadarko will comply with all applicable regulations, NTLs, and lease stipulations regarding solid waste disposal. Waste management practices including waste minimization and recycling programs will minimize the chance of trash or debris being lost overboard and subsequently washing up on beaches.

(b) Accidents

The OSRA modeling indicates no contacts with shorelines within 3 days after a spill and a very small probability of contacting any shorelines within 10 days after a spill. During this time, all of the spill volume would be removed due to spill weathering and response measures. Therefore, no impacts on coastal recreation and tourism would be expected.

C. IMPACTS ON PROPOSED ACTIVITIES

C.1 GEOLOGIC HAZARDS

A shallow hazards report covering AT 261 was submitted with the Initial Exploration Plan for this lease in accordance with NTL 2003-G17 and NTL 98-20. The analysis concluded that the wellsites are free of any major geological hazards. A shallow hazard report covering MC 920 is being submitted separately to the MMS. Right-of-way pipelines will be permitted under separate pipeline applications that will contain individual hazard assessments. The pipeline route hazard assessments indicate there are no geologic hazards along the pipeline route that would hinder pipeline or umbilical construction activities or impede performance.

C.2 SEVERE WEATHER

Under most circumstances, weather is not expected to have any effect on the proposed activities. Extreme weather, including high winds, strong currents, and large waves, have been taken into account in the design criteria for the Independence Hub. High winds and limited visibility during a severe storm could disrupt support activities (vessel and helicopter traffic) and might make it necessary to suspend some activities for safety reasons until the storm or weather event passes. In the event of a hurricane, procedures as outlined in Anadarko's Hurricane Evacuation Plan as well as the rig's Emergency Response Manual for Hurricanes would be adhered to.

C.3 CURRENTS AND WAVES

Under most circumstances, physical oceanographic conditions are not expected to have any effect on the proposed activities. Strong currents and large waves have been taken into account in the design criteria for the Independence Hub. High waves during a severe storm could disrupt support activities (vessel and helicopter traffic) and might make it necessary to suspend some activities for safety reasons until the storm or weather event passes.

D. ALTERNATIVES

In the development of the proposed action, Anadarko has considered various technical and operational options. However, no formal alternatives were analyzed.

E. MITIGATION MEASURES

The proposed action does not involve any mitigation measures other than those required by laws and regulations, including all applicable Federal, State, and local requirements concerning air emissions, discharges to water, and solid waste disposal, as well as any additional permit requirements. All project activities will be conducted under an MMS-approved Sub-Regional OSRP, which has been submitted to the MMS under separate cover.

F. CONSULTATION

No persons or agencies were consulted during the preparation of this EIA.

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APPENDIX I
CZM CONSISTENCY CERTIFICATION

The Louisiana Coastal Zone Management Program includes the following: general coastal use guidelines, levees, linear facilities (pipelines); dredged soil deposition; shoreline modifications, surface alterations, hydrologic and sediment transport modifications, waste disposal; uses that result in the alteration of waters draining into coastal waters; oil, gas, or other mineral activities; and air and water quality.

Relevant enforceable policies were considered in certifying consistency for Louisiana

The Alabama Coastal Zone Management Program includes the following: review of all coastal resource uses and activities that have a direct and significant effect on the coastal area. Uses subject to the Alabama CZM Program are divided into regulated and non-regulated categories. Regulated uses are those that have a direct and significant impact on the coastal areas. These uses require a State permit or are required by Federal law to be consistent with the management program. Uses that require a State permit must receive a certificate of compliance. Non-regulated uses are those activities that have a direct and significant impact on the coastal areas but do not require a State permit or Federal consistency certification. Non-regulated uses must be consistent with the ACAMP and require local permits to be administered by ADEM.

CZM Consistency Certifications for Louisiana and Alabama, are enclosed as **Attachment I-1**.

ALABAMA COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION
ATWATER VALLEY BLOCK 261

...e OCS related oil and gas development activities having potential impact on the Alabama Coastal Zone are based on the location of the proposed facilities, access to those sites, best practical techniques for operations and production equipment, guidelines for the prevention of adverse environmental effects, effective environmental protection, emergency plans and contingency plans. Alabama policies have been addressed below or are cross referenced to the appropriate sections of the plan:

Topic	Cross Reference	Comments
Coastal Resource Use Policies		
Coastal Development		Dock and port facilities in LA will be used. There will be no new construction, dredging, or filling in Alabama state waters. There will be no new commercial development or capital improvements in Alabama's coastal zone, nor will there be any employment effects.
Mineral Resource Exploration and Extraction		Proposed operations will take place 170 miles from Alabama's coastline.
Commercial Fishing	Appendix H	
Hazard Management	Appendix C	A Shallow Hazards Report has been prepared and submitted to MMS in order to identify and assess the seafloor and shallow geologic conditions in this block(s).
Shoreline Erosion	Appendix H	Proposed operations will take place 170 miles from Alabama's coastline.
Recreation	Appendix H	
Transportation	Appendix B	
Natural Resource Protection Policies		
Biological Productivity	Appendix H	
Water Quality	Appendix H	
Water Resources	Appendix H	
Air Quality	Appendix G	
...Vetlands and Submerged Grassbeds	Appendix H	
...each and Dune Protection	Appendix H	
Wildlife Habitat Protection	Appendix H	
Endangered Species	Appendix H	
Cultural Resources Protection	Appendix D	This block does not lie within a high probability zone for historic shipwrecks, and thus does not require an archaeological report. As part of the Hazards Report, it was determined that no man-made facilities nor seafloor obstructions were located in this block(s)

The proposed activities described in detail in the Plan comply with Alabama's approved Coastal Management Program(s) and will be conducted in a manner consistent with such Program(s).

Anadarko Petroleum Corporation

Judy Davidson
Staff Regulatory Analyst

Date: May 26, 2005

COASTAL ZONE MANAGEMENT

CONSISTENCY CERTIFICATION

INITIAL DEVELOPMENT OPERATIONS COORDINATION DOCUMENT
ATWATER VALLEY BLOCK 261
OCS-G 16890

The proposed activities described in detail in this OCS Plan comply with Louisiana's approved Coastal Zone Management Program(s) and will be conducted in a manner consistent with such Program(s).

Anadarko Petroleum Corporation

Judy Davidson, Certifying Official

May 26, 2005

U.S. Department of the Interior
Minerals Management Service

OCS PLAN INFORMATION FORM

OMB Control Number: 1010-0049
OMB Approval Expires: August 31, 2006

General Information

Type of OCS Plan:		Exploration Plan (EP)	x Development Operations Coordination Document (DOCD)
Company Name:	Anadarko Petroleum Corporation	MMS Operator Number:	00981
Address:	1201 Lake Robbins Drive	Contact Person:	Judy Davidson
	The Woodlands, TX 77380	Phone Number:	(832) 636-8766
		E-Mail Address:	judy_davidson@anadarko.com

Lease(s): G16890	Area: AT	Block(s): 261	Project Name (If Applicable): Vortex

Objective(s):		Oil	x	Gas		Sulphur		Salt	Onshore Base: Fourchon, Louisiana	Distance to Closest Land (Miles): 120

Description of Proposed Activities (Mark all that apply)

	Exploration drilling		Development drilling
x	Well completion		Installation of production platform
	Well test flaring (for more than 48 hours)		Installation of production facilities
	Installation of caisson or platform as well protection structure		Installation of satellite structure
x	Installation of subsea wellheads and/or manifolds	x	Commence production
x	Installation of lease term pipelines		Other (Specify and describe)

Have you submitted or do you plan to submit a Conservation Information Document to accompany this plan?	x	Yes		No
Do you propose to use new or unusual technology to conduct your activities	x	Yes		No
Do you propose any facility that will serve as a host facility for deepwater subsea development?		Yes	x	No
Do you propose any activities that may disturb an MMS-designated high-probability archaeological area?		Yes	x	No
Have all of the surface locations of your proposed activities been previously reviewed and approved by MMS?	x	Yes		No

Tentative Schedule of Proposed Activities

Proposed Activity	Start Date	End Date	No. of Days
Complete two wells and install subsea trees	01-01-06	03-22-06	80
Install two lease term pipelines and subsea manifold	05-01-07	05-10-07	10
Commence production	07-01-07	06-30-14	

Description of Drilling Rig

	Jackup	x	Drillship
	Gorilla Jackup		Platform rig
	Semisubmersible		Submersible
	DP Semisubmersible		Other (Attach Description)
Drilling Rig Name (If Known): Deepwater Millennium			

Description of Production Platform

	Caisson		Tension leg platform
	Well protector		Compliant tower
	Fixed platform		Guyed tower
	Subsea manifold		Floating production system
	Spar		Other (Attach Description)

Description of Lease Term Pipelines

From (Facility/Area/Block)	To (Facility/Area/Block)	Diameter (Inches)	Length (Feet)
AT 261 Well No. 1 ST01	Subsea Manifold	6"	80'
AT 261 Well A	Subsea Manifold	6"	80'

OCS PLAN INFORMATION FORM

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): AT 261 Well 001 ST01	Subsea Completion			
Anchor Radius (if applicable) in feet: NA	x	Yes		No

	Surface Location	Bottom-Hole Location (For Wells)
Lease No.	OCS G16890	OCS
Area Name	AT	
Block No.	261	
Blockline Departures (in feet)	N/S Departure: 974 F N L	N/S Departure: F L
	E/W Departure: 3206 F E L	E/W Departure: F L
Lambert X-Y coordinates	X: 1,343,194	X:
	Y: 10,073,266	Y:
Latitude/ Longitude	Latitude	Latitude
	Longitude	Longitude
	TVD (Feet) :	MD (Feet): Water Depth (Feet): 8330

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

Paperwork Reduction Act of 1995 Statement: The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N.W., Washington, DC 20240.

OCS PLAN INFORMATION FORM

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location					
Well or Structure Name/Number (If renaming well or structure, reference previous name): AT 261 Well Location A				Subsea Completion	
Anchor Radius (if applicable) in feet: NA				x Yes	No

	Surface Location	Bottom Hole Location (For Wells)
Lease No.	OCS 16890	OCS 0
Area Name	AT	
Block No.	261	
Blockline Departures (in feet)	N/S Departure: 253 F N L	N/S Departure: F____ L
	E/W Departure: 581 F E L	E/W Departure: F____ L
Lambert X-Y coordinates	X: 1,345,819	X:
	Y: 10,135,385	Y:
Latitude/ Longitude	Latitude	Latitude
	Longitude	Longitude
	TVD (Feet) :	MD (Feet): Water Depth (Feet): 8320

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

Paperwork Reduction Act of 1995 Statement: The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N.W., Washington, DC 20240.